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EDITED BY

GEORGE H. CARPENTER, B.Sc.LOND.

AND

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ERRATA.

- Page 3, line 8 from bottom, for *congulus* read *longulus*.
" 5, " 5 from top, for *clavicorinus* read *clavicornis*.
" 5, " 10 " " *cætatus* read *cælatus*.
" 6, " 20 " " *Laheridius* read *Lathridius*.
" 6, " 10 " " *psolifesicornis* read *prolifericornis*.
" 7, " 1 " " *cochlearia* read *cochlearia*.
" 8, " 5 and 6 from bottom, delete record of *H. melenarius*.
" 49, " 19 from top, for 1878 read 1879.
" 120, " 2 for W. H. Cunnington read W. A. Cunnington.

The Irish Naturalist.

VOLUME IX.

IRISH RUBI.

BY G. CLARIDGE DRUCE, M.A., F.L.S.

DR. FOCKE has kindly looked over some Brambles collected by me in Ireland in 1898, and reports as follows. It must be borne in mind, however, that the identification of a Bramble from a single dried specimen is hardly fair even to the most expert specialist, and in some of the following instances I was only able to supply such confessedly imperfect material:—

Rubus Borreri, Bell-Salter—Near Lough Gilly, Co. Armagh.

R. incurvatus, Bab.—Near Toome Bridge, Co. Derry. Not given for district xii. in *Cyb. Hib.*

R. Leyanus, Rogers—Near Toome Bridge, Derry and Antrim. Not in district xii. in *Cyb. Hib.*

R. Griffithianus, Rogers—Cave Hill, Antrim; as this is not included in *Cyb. Hib.* it will have to be re-gathered.

R. pilcatus, W. and N.—Near Lough Neagh, Derry.

R. radula, Weihe.—Tollymore Park, Co. Down.

R. pulcherrimus, Neum.—Lough Gilly, Co. Armagh. Not given for district x. in *Cyb. Hib.*

R. anglosaxonicus, Gelert.—Glenarm, Co. Antrim. Not given for district xii. in *Cyb. Hib.*

R. villicaulis, W. and N.—Near Toome Bridge, Co. Derry.

R. mucronatus, Blox., var. **trifoliatus**.—On Cave Hill; a form not previously recorded for Ireland.

R. macrophyllus, W. and N.—Very fine and luxuriant between Glenarm and Glenariff.

R. pyramidalis, Kalt.—Cave Hill, Co. Antrim.

High-street, Oxford.

BEETLES COLLECTED IN LOUGH FOYLE DISTRICT,
COS, DONEGAL AND DERRY.

BY C. W. BUCKLE.

THE beetles included in the following list, which numbers about 760 species, were all taken within ten miles of the shores of Lough Foyle during the years 1896 to 1899. Among the more interesting beetles which are specially mentioned at the end of the list are some forty species which had not previously been taken in Ireland or hitherto remained unrecorded.

On the north shore of Lough Foyle, where the majority of the collection was made, the soil is chiefly a wet clay overlying rock. A narrow strip of land of a width varying from two to four miles bordering the Lough is cultivated, and behind this comes an uninterrupted chain of hills of moderate height—the highest being 1,300 feet—extending from Culmore to Inishowen Head. These hills, which are covered with a thick layer of peat, are, speaking generally, too wet and uncongenial for most beetles, except aquatic and semi-aquatic species. The beetles met with on the drier portions include *Carabus calenulatus*, *C. nitens*, *Pterostichus vitreus*, &c., but the Donegal hills seem unproductive of many rarities; the majority of beetles met with being the commoner *Carabidæ*. The most successful collecting was done on the low-lying land bordering the north shore of Lough Foyle. Very little collecting was done on the south side of the Lough, where the country is much drier. The sand-hills at Magilligan, and at Buncrana, Lough Swilly, were very productive, considering the small amount of time that was spent there. They produced such local species as *Tachinus elongatus*, *Acidota crenata*, *Xantholinus distans*, *Bledius longulus*, *B. erraticus*, *Helophorus rugosus*, *Cistela luperus*, *Otiorrhynchus blandus*, *Sitones cambricus*, *S. lineellus*, *Rhinonchus castor*, &c., besides a large number of commoner things.

The nomenclature used is that of the Catalogue of British Coleoptera by Sharp and Fowler, 1893.

<i>Cyclus rostratus.</i>	<i>Amara apricaria.</i>	<i>Bembidium bipunctatum.</i>
<i>Carabus catenulatus.</i>	<i>A. spinipes.</i>	<i>B. punctulatum.</i>
<i>C. nemoralis.</i>	<i>A. bifrons.</i>	<i>Tachypus flavipes.</i>
<i>C. nitens.</i>	<i>A. ovata.</i>	<i>Æpus marinus.</i>
<i>C. granulatus.</i>	<i>A. acuminata.</i>	<i>Trechus rubens.</i>
<i>Notiophilus biguttatus.</i>	<i>A. tibialis.</i>	<i>T. minutus.</i>
<i>N. substriatus.</i>	<i>A. lunicollis.</i>	var. <i>obtusus.</i>
<i>N. aquaticus.</i>	<i>A. familiaris.</i>	<i>Patrobus assimilis.</i>
<i>N. palustris.</i>	<i>A. trivialis.</i>	<i>Dromius linearis.</i>
<i>Leistus fulvibarbis.</i>	<i>A. communis.</i>	<i>D. meridionalis.</i>
<i>L. rufescens.</i>	<i>Calathus cisteloides.</i>	<i>D. iv.-maculatus.</i>
<i>Nebria brevicollis.</i>	<i>C. mollis.</i>	<i>D. iv.-notatus.</i>
<i>N. Gyllenhalii.</i>	<i>C. melanocephalus.</i>	<i>D. melanocephalus.</i>
<i>Blethisa multipunctata.</i>	var. <i>nubigena.</i>	<i>D. nigriventris.</i>
<i>Elaphrus riparius.</i>	<i>C. piceus.</i>	<i>Haliphus flavicollis.</i>
<i>E. cupreus.</i>	<i>Taphria nivalis.</i>	<i>H. fulvus.</i>
<i>Loricera pilicornis.</i>	<i>Pristonychus terricola.</i>	<i>H. ruficollis.</i>
<i>Clivina fossor.</i>	<i>Anchomenus angusticollis.</i>	<i>H. fluviatilis.</i>
<i>Dyschirius thoracicus.</i>	<i>A. dorsalis.</i>	<i>H. lineatocollis.</i>
<i>D. politus.</i>	<i>A. albipes.</i>	<i>Noterus sparsus.</i>
<i>D. æneus.</i>	<i>A. marginatus.</i>	<i>Laccophilus hyalinus.</i>
<i>D. globosus.</i>	<i>A. parumpunctatus.</i>	<i>Celambus inæqualis.</i>
<i>Brosicus cephalotes.</i>	<i>A. atratus.</i>	<i>C. impressopunctatus.</i>
<i>Badister bipustulatus.</i>	<i>A. fuliginosus.</i>	<i>Deronectes assimilis.</i>
<i>Bradycellus distinctus.</i>	<i>A. gracilis.</i>	<i>D. depressus.</i>
<i>B. verbasci.</i>	<i>A. piceus.</i>	<i>D. xii.-pustulatus.</i>
<i>B. harpalinus.</i>	<i>A. puellus.</i>	<i>Hydroporus lepidus.</i>
<i>B. similis.</i>	<i>Olisthopus rotundatus.</i>	<i>H. rivalis.</i>
<i>Harpalus rufibarbis.</i>	<i>Cilleus lateralis.</i>	<i>H. septentrionalis.</i>
<i>H. ruficornis.</i>	<i>Bembidium rufescens.</i>	<i>H. Davisii.</i>
<i>H. æneus.</i>	<i>B. v-striatum.</i>	<i>H. tristis.</i>
<i>H. latus.</i>	<i>B. obtusum.</i>	<i>H. umbrosus.</i>
<i>H. tardus.</i>	<i>B. Mannerheimi.</i>	<i>H. angustatus.</i>
<i>Dichirotrichus pubescens.</i>	<i>B. æneum.</i>	<i>H. Gyllenhalii.</i>
<i>Stomis pumicatus.</i>	<i>B. doris.</i>	<i>H. morio.</i>
<i>Pterostichus cupreus.</i>	<i>B. minimum.</i>	<i>H. vittula.</i>
<i>P. versicolor.</i>	<i>B. lampros.</i>	<i>H. palustris.</i>
<i>P. madidus.</i>	<i>B. tibiale.</i>	<i>H. incognitus.</i>
<i>P. vitreus.</i>	<i>B. atrocæruleum.</i>	<i>H. erythrocephalus.</i>
<i>P. niger.</i>	<i>B. decorum.</i>	<i>H. congolus.</i>
<i>P. vulgaris.</i>	<i>B. affine.</i>	<i>H. memnonius.</i>
<i>P. nigrita.</i>	<i>B. monticola.</i>	<i>H. obscurus.</i>
<i>P. minor.</i>	<i>B. concinnum.</i>	<i>H. nigrita.</i>
<i>P. strenuus.</i>	<i>B. femoratum.</i>	<i>H. discretus.</i>
<i>P. diligens.</i>	<i>B. bruxellense.</i>	<i>H. pubescens.</i>
<i>P. striola.</i>	<i>B. littorale.</i>	<i>H. planus.</i>
<i>Amara fulva.</i>	<i>B. pallidipennis.</i>	<i>H. lituratus.</i>

- Agabus guttatus.*
A. paludosus.
A. unguicularis.
A. nebulosus.
A. Sturmii.
A. chalconotus.
A. bipustulatus.
Ilybius fuliginosus.
I. ater.
Rhantus notatus.
R. bistriatus.
Colymbetes fuscus.
Dytiscus punctulatus.
D. marginalis.
Acilius sulcatus.
Gyrinus natator.
G. elongatus.
G. opacus.
Hydrobius fuscipes.
Anacæna globulus.
A. limbata.
Philydrus melanocephalus
P. coarctatus.
Laccobius sinuatus.
L. alutaceus.
L. minutus.
Limnebius truncatellus.
Chetarthria seminulum.
Helophorus rugosus.
H. nubilus.
H. intermedius.
H. aquaticus.
H. æneipennis.
H. brevicollis.
H. arvernicus.
Henicocerus exsculptus.
Oethebius bicolor.
Hydræna riparia.
H. gracilis.
H. atricapilla.
H. pulchella.
Cyclonotum orbiculare.
Sphæridium scarabæoides.
S. bipustulatum.
Cercyon littoralis.
C. hæmorrhous.
C. obsoletus.
- Cercyon hæmorrhoidalis.*
C. flavipes.
C. lateralis.
C. melanocephalus.
C. unipunctatus.
C. quisquilius.
C. pygmæus.
C. analis.
Megasternum boletophagum.
Cryptopleurum atomarium
Aleochara fuscipes.
A. lanuginosa.
A. mæsta.
A. nitida.
A. morion.
A. grisea.
A. algarum.
A. obscurella.
Microglossa nidicola.
Oxyptoda lividipennis.
O. opaca.
O. umbrata.
O. longiuscula.
O. hæmorrhœa.
O. brachyptera.
Ocalea castanea.
Myrmecodia collaris.
Astilbus canaliculatus.
Callicerus obscurus.
Homalota currax.
H. cambrica.
H. gregaria.
H. fragilis.
H. hygrotopera.
H. volans.
H. vestita.
H. nitidula.
H. vicina.
H. graminicola.
H. halobrectha.
H. puncticeps.
H. occulta.
H. fallaciosa.
H. circellaris.
H. eremita.
H. analis
- Homalota hepatica.*
H. xanthoptera.
H. trinotata (var.)
H. corvina.
H. atricolor.
H. nigra.
H. germana.
H. atramentaria.
H. longicornis.
H. sordida.
H. aterrima.
H. laticollis.
H. montivigans.
H. fungi.
var. clientula.
Grypeta labilis.
Tachyusa constricta.
T. flavitarsis (var.)
T. atra.
Falagria obscura.
Encephalus complicans.
Bolitochara obliqua.
Phytosus balticus.
Oligota inflata.
Mylæna dubia.
M. brevicornis.
Gymnusa brevicollis.
Hypocyptus ovulum.
H. seminulum.
Conosoma pubescens.
C. lividum.
Tachyporus obtusus.
var. nitidicollis
T. solutus.
T. chrysomelinus.
T. humerosus.
T. tersus.
T. hypnorum.
T. pusillus.
T. brunneus.
Tachinus pallipes.
T. rufipes.
T. subterraneus.
T. laticollis.
T. elongatus.
Megacronus analis.
M. cingulatus.

<i>Bolitobius trinitatus.</i>	<i>Philonthus quisquiliarius.</i>	<i>Bledius longulus.</i>
<i>Mycetoporus lepidus.</i>	var. <i>dimidiatus.</i>	<i>B. erraticus.</i>
<i>M. longulus.</i>	<i>P. nigrita.</i>	<i>Platystethus arenarius.</i>
<i>M. nanus.</i>	<i>P. trossulus.</i>	<i>Oxytelus rugosus.</i>
<i>M. clavicornus.</i>	<i>P. puella.</i>	<i>O. laqueatus.</i>
<i>M. splendidus.</i>	<i>Casius xantholoma.</i>	<i>O. maritimus.</i>
<i>Habrocerus capillaricornis.</i>	<i>Actobius cinerascens.</i>	<i>O. nitidulus.</i>
<i>Heterothops binotata.</i>	<i>Xantholinus glabratus.</i>	<i>O. complanatus.</i>
<i>H. dissimilis.</i>	<i>X. punctulatus.</i>	<i>O. tetracarinatus.</i>
<i>Quedius mesomelinus.</i>	<i>X. ochraceus.</i>	<i>Haploderus cœtatus.</i>
<i>Q. puncticollis.</i>	<i>X. distans.</i>	<i>Ancyrophorus omalinus.</i>
<i>Q. cinctus.</i>	<i>X. linearis.</i>	<i>Trogophloeus bilineatus.</i>
<i>Q. fuliginosus.</i>	<i>Baptolinus alternans.</i>	<i>T. rivularis.</i>
<i>Q. tristis.</i>	<i>Othius fulvipes.</i>	<i>T. fuliginosus.</i>
<i>Q. molochinus.</i>	<i>O. læviusculus.</i>	<i>T. corticinus.</i>
<i>Q. maurorufus.</i>	<i>O. melanocephalus.</i>	<i>Thinobius linearis.</i>
<i>Q. scintillans.</i>	<i>O. myrmecophilus.</i>	<i>T. longipennis.</i>
<i>Q. rufipes.</i>	<i>Lathrobium elongatum.</i>	<i>Lesteva pubescens.</i>
<i>Q. attenuatus.</i>	<i>L. boreale.</i>	<i>L. longelytrata.</i>
<i>Q. semiæneus.</i>	<i>L. fulvipenne.</i>	<i>L. sicula.</i>
<i>Q. boops.</i>	<i>L. brunnipes.</i>	<i>Acidota crenata.</i>
<i>Staphylinus pubescens.</i>	<i>L. quadratum.</i>	<i>Olophrum piceum.</i>
<i>S. cæsarius.</i>	<i>L. terminatum.</i>	<i>Lathrimicum unicolor.</i>
<i>S. erythropterus.</i>	var. <i>immaculatum.</i>	<i>Philorhinum sordidum.</i>
<i>Ocypus olens.</i>	<i>L. multipunctatum.</i>	<i>Coryphium angusticollis.</i>
<i>O. cupreus.</i>	<i>Stilicus rufipes.</i>	<i>Omalius rivulare.</i>
<i>O. morio.</i>	<i>S. orbiculatus.</i>	<i>O. riparium.</i>
<i>Philonthus splendens.</i>	<i>S. affinis.</i>	<i>O. excavatum.</i>
<i>P. intermedius.</i>	<i>Sunius diversus.</i>	<i>O. cæsum.</i>
<i>P. laminatus.</i>	<i>Stenus juno.</i>	<i>O. pusillum.</i>
<i>P. æneus.</i>	<i>S. speculator.</i>	<i>O. florale.</i>
<i>P. proximus.</i>	<i>S. buphthalmus.</i>	<i>O. concinnum.</i>
<i>P. addendus.</i>	<i>S. canaliculatus.</i>	<i>Authobium minutum.</i>
<i>P. carbonarius.</i>	<i>S. declaratus.</i>	<i>Proteinus ovalis.</i>
<i>P. politus.</i>	<i>S. crassus.</i>	<i>Megarthrus denticollis.</i>
<i>P. lucens.</i>	var. <i>littoralis.</i>	<i>M. depressus.</i>
<i>P. varius.</i>	<i>S. brunnipes.</i>	<i>Phlacobium clypeatum.</i>
<i>P. marginatus.</i>	<i>S. ossium.</i>	<i>Pselaphus Heisei.</i>
<i>P. umbratilis.</i>	<i>S. impressus.</i>	<i>Tychus niger.</i>
<i>P. cephalotes.</i>	<i>S. pubescens.</i>	<i>Bythinus puncticollis.</i>
<i>P. fimetarius.</i>	<i>S. pallitarsis.</i>	<i>B. bulbifer.</i>
<i>P. sordidus.</i>	<i>S. bifoveolatus.</i>	<i>Bryaxis Helfer.</i>
<i>P. ebeninus.</i>	<i>S. tempestivus.</i>	<i>B. junceorum.</i>
<i>P. sanguinolentus.</i>	<i>S. picipes.</i>	<i>Scydmaenus collaris.</i>
<i>P. longicornis.</i>	<i>S. similis.</i>	<i>Calyptomerus dubius.</i>
<i>P. varians.</i>	<i>S. paganus.</i>	<i>Clambus sp.</i>
<i>P. ventralis.</i>	<i>Bledius arenarius.</i>	<i>Agathidium nigripenne.</i>

- Agathidium levigatum.*
Anistoma ovalis.
A. calcarata.
Necrophorus humator.
N. mortuorum.
N. ruspator.
 var. *microcephalus.*
Necrodes littoralis.
Silpha opaca.
S. rugosa.
S. atrata, var. *subrotundata*
Choleva agilis.
C. cisteloides.
C. fusca.
C. morio.
C. grandicollis.
C. tristis.
C. chrysomeloides.
C. Watsoni.
Ptomophagus sericeus.
Colin serripes.
C. angular.
C. brunneum.
Hister cadaverinus.
H. neglectus.
H. bimaculatus.
Saprinus nitidulus.
S. æneus.
Onthophilus striatus.
Actidium coarctatum.
Ptenidium punctatum.
Adalia oblitterata.
Anatis occellata.
Coccinella x-punctata.
C. hieroglyphica.
C. xi-punctata.
C. vii-punctata.
Halysia xiv-guttata.
H. xviii-guttata.
H. xxii punctata.
Hyperaspis reppensis.
Scymnus Redentbacheri.
Rhizobius litura.
Coccidula rufa.
Micropeplus porcatus.
M. margaritæ.
M. tessera.
- Brachypterus pubescens.*
B. urtica.
Cercus rufilabris.
Epurea æstiva.
E. oblonga.
E. longula.
E. florea.
E. obsoleta.
E. pusilla.
E. angustula.
Nitidula bipustulata.
Meligethes æneus.
M. viridescens.
M. picipes.
M. erythropus.
Rhizophagus depressus.
R. ferrugineus.
R. dispar.
Monotoma picipes.
Laheridius laudarius.
Coninomus nodifer.
Enicmus minutus.
E. transversus.
Corticaria denticulata.
C. elongata.
Melanophthalma gibbosa.
Telmatophilus caricis.
Antherophagus nigricornis
A. pallens.
Gryptophagus setulosus.
C. pilosus.
G. saginatus.
C. scanicus.
C. dentatus.
C. distinguendus.
Micrambe vini.
Paramecosoma melanoc-
 phalum.
Atomaria nigricentris.
A. Wollastoni.
A. fuscipes.
A. peltata.
A. fuscata.
A. pusilla.
A. atricapilla.
A. analis.
Ephastemus gyrimoides.
- Byturus tomentosus.*
Attagenus pelli.
Byrrhus fasciatus.
B. dorsalis.
Cytilus varius.
Simplocaria semistriata.
Elmis Volkmar.
E. parallelopedus.
Limnius tuberculatus.
Parnus psolifesicornis.
P. auriculatus.
Aphodius fossor.
A. fumetarius.
A. scybalarius.
A. ater.
A. constans.
A. granarius.
A. nitidulus.
A. rufescens.
A. lapponum.
A. putridus.
A. mordarius.
A. puncto-sulcatus
A. prodromus.
A. contaminatus.
A. rufipes.
A. depressus.
Egialia arenaria.
Geotrupes stercorarius.
G. sylvaticus.
G. vernalis.
Serica brunnea.
Melolontha vulgaris.
Phyllopertha horticola.
Lacon murinus.
Cryptohypnus riparius.
C. dermestoides.
 var. *iv-guttatus.*
Elater pomorum.
Athous niger.
A. hemorrhoidalis.
Adrastus limbatus.
Agriotes obscurus.
A. lineatus.
Dolopus marginatus.
Corymbites cupreus.
 var. *æruginosus.*

<i>C. tessellatus</i> ,	<i>Phædon cochlariæ</i> .	<i>Anthicus floralis</i> .
<i>C. quercus</i> ,	<i>Hydrothassa marginella</i> .	<i>Meloe proscarabæus</i> .
var. <i>ochropterus</i> .	<i>Prasocuris phelandrii</i> .	var. <i>cyaneus</i> .
<i>Dascillus cervinus</i> .	<i>Loxmeza suturalis</i> .	<i>Rhynchites minutus</i> .
<i>Helodes minuta</i> .	<i>L. sanguinea</i> .	<i>Deporaus betulæ</i> .
<i>H. marginata</i> ,	<i>Galerucella nymphaea</i> .	<i>Apion cruentatum</i> .
<i>Microcara livida</i> .	<i>G. sagittariæ</i> .	<i>A. hæmatodes</i> .
<i>Cyphon coarctatus</i> .	<i>G. lineola</i> .	<i>A. vicia</i> .
<i>C. nitidulus</i> .	<i>Longitarsus ater</i> .	<i>A. fagi</i> .
<i>C. variabilis</i> .	<i>L. luridus</i> .	<i>A. dichroum</i> .
<i>C. padi</i> .	<i>L. atricillus</i> .	<i>A. carduorum</i> .
<i>Hydrocyphon deflexicollis</i> .	<i>L. melanocephalus</i> .	<i>A. virens</i> .
<i>Telephorus nigricans</i> , var.	<i>L. suturalis</i> !	<i>A. ervi</i> .
<i>discoidens</i> .	<i>L. piciceps</i> .	<i>A. vorax</i> .
<i>T. lituratus</i> .	<i>L. ballotæ</i> .	<i>A. Gyllenhali</i> .
<i>T. darwinianus</i> .	<i>L. exoletus</i> !	<i>A. loti</i> .
<i>T. bicolor</i> ,	<i>L. pusillus</i> .	<i>A. marchicum</i> .
<i>T. thoracicus</i> ,	<i>L. jacobææ</i> .	<i>A. violaceum</i> .
<i>T. paludosus</i> .	<i>L. gracilis</i> .	<i>A. hydrolapathi</i> .
<i>Rhagonycha fulva</i> .	<i>L. pellucidus</i> .	<i>A. humile</i> .
<i>R. limbata</i> .	<i>Phyllotreta undulata</i> .	<i>Otiorrhynchus atropterus</i> .
<i>R. elongata</i> .	<i>P. nemorum</i> .	<i>O. blandus</i> .
<i>Malthodes marginatus</i> .	<i>Apthona nonstriata</i> .	<i>O. maurus</i> .
<i>M. atomus</i> .	<i>A. atratula</i> .	<i>O. auro-punctatus</i> .
<i>Ptinus fur</i> .	<i>Sphæroderma testaceum</i> .	<i>O. ligneus</i> .
<i>Niptus hololeucus</i> .	<i>Apteropeda orbiculata</i> .	<i>O. picipes</i> .
<i>N. crenatus</i> .	<i>A. globosa</i> .	<i>O. sulcatus</i> .
<i>Priobium castaneum</i> .	<i>Crepidodera transversa</i> .	<i>O. rugifrons</i> .
<i>Anobium domesticum</i> .	<i>C. ferruginea</i> .	<i>O. muscorum</i> .
<i>Ochina hederae</i> .	<i>C. helvina</i> .	<i>Strophosomus coryli</i> .
<i>Cis boleti</i> .	<i>Plectroscelis concinna</i> .	<i>Exomias araneiformis</i> .
<i>Rhagium inquisitor</i> .	<i>Psylliodes chrysocephala</i> .	<i>Sciaphilus muricatus</i> .
<i>R. bifasciatum</i> .	var. <i>anglica</i> .	<i>Tropiphorus obtusus</i> .
<i>Donacia thalassina</i> .	<i>P. napi</i> .	<i>Liophlæus nubilus</i> .
<i>D. impressa</i> .	<i>P. cuprea</i> .	<i>Polydrusus micans</i> .
<i>D. sericea</i> .	<i>P. affinis</i> .	<i>P. tereticollis</i> .
<i>D. discolor</i> .	<i>Cassida flaveola</i> .	<i>P. pterygomalis</i> .
<i>Lema lichenis</i> .	<i>C. hemisphærica</i> .	<i>P. cervinus</i> .
<i>L. septentrionis</i> .	<i>Cistela luperus</i> .	<i>Phyllobius oblongus</i> .
<i>Chrysomela Banksii</i> .	<i>Lagria hirta</i> .	<i>P. pyri</i> .
<i>C. staphylea</i> .	<i>Salpingus castaneus</i> .	<i>P. argentatus</i> .
<i>C. polita</i> .	<i>Rhinostinus viridipennis</i> .	<i>P. viridicæris</i> .
<i>C. varians</i> .	<i>R. planirostris</i> .	<i>Philopodon geminatus</i> .
<i>C. fastuosa</i> .	<i>Nacædes melanura</i> .	<i>Barynotus obscurus</i> .
<i>C. hyperici</i> .	<i>Anaspis frontalis</i> .	<i>B. Schonherri</i> .
<i>Gastroidea viridula</i> .	<i>A. ruficollis</i> .	<i>B. elevatus</i> .
<i>Phædon tumidulus</i> .	<i>A. maculata</i> .	<i>Alophus triguttatus</i> .

<i>Sitones griseus.</i>	<i>Erirrhinus acridulus.</i>	<i>Ceuthorrhynchus contrac-</i>
<i>S. cambricus.</i>	<i>Thryogenes nereis.</i>	<i>tus.</i>
<i>S. regensteinessis.</i>	<i>Dorytomus tortrix.</i>	<i>C. hirtulus.</i>
<i>S. lineellus.</i>	<i>D. maculatus.</i>	<i>C. quadridens.</i>
<i>S. meliloti.</i>	<i>D. pectoralis.</i>	<i>C. pollinarius.</i>
<i>S. flavescens.</i>	<i>Anoplus plantaris.</i>	<i>C. viduatus.</i>
<i>S. suturalis.</i>	<i>A. roboris.</i>	<i>C. angulosus.</i>
<i>S. lineatus.</i>	<i>Elleschus bipunctatus.</i>	<i>C. pleurostigma.</i>
<i>S. sulcifrons.</i>	<i>Miccotrogus picirostris.</i>	<i>C. rugulosus.</i>
<i>Hypera punctata.</i>	<i>Mecinus pyraister.</i>	<i>C. litura.</i>
<i>H. rumicis.</i>	<i>Anthonomus pedicularius.</i>	<i>Ceuthorrhynchidius</i>
<i>H. polygoni.</i>	<i>A. rubi.</i>	<i>troglodytes.</i>
<i>H. variabilis.</i>	<i>A. comari.</i>	<i>Rhinoncus pericarpus.</i>
<i>H. plantaginis.</i>	<i>Cionus hortulanus.</i>	<i>R. perpendicularis.</i>
<i>H. nigrirostris.</i>	<i>Orobitis cyaneus.</i>	<i>R. castor.</i>
<i>Liosoma ovatum.</i>	<i>Acalles ptinoides.</i>	<i>Phytobius iv-tuberculatus.</i>
<i>Hylobius abietis.</i>	<i>A. turbatus.</i>	<i>Balaninus salicivorus.</i>
<i>Orchestes quercus.</i>	<i>Calliodes rubicundus.</i>	<i>B. pyrrhoceras.</i>
<i>O. scutellaris.</i>	<i>C. quercus.</i>	<i>Rhopalomesites Tardvi.</i>
<i>O. fagi.</i>	<i>C. iv-maculatus.</i>	<i>Hylastes ater.</i>
<i>O. salicis.</i>	<i>Ceuthorrhynchus assimilis</i>	<i>H. palliatus.</i>
<i>Grypdius equiseti.</i>	<i>C. erice.</i>	<i>Hylastinus obscurus.</i>
		<i>Trypodendron domesticum.</i>

In the following list of the more interesting captures, those which have not been previously recorded from Ireland are marked with an asterisk :—

Carabus nitens.—Common on Donegal mountains in May and June.

Blethisa multipunctata.—In swamp among rotten rushes.

Pterostichus vitreus.—Common under dried turf, Glencaw mountain, and at Whitecastle.

***Bembidium monticola.**—A single specimen under stones, borders of Drung River.

B. conclunum.—River banks, Donegal and Derry; not common.

B. affine.—Banks of mountain rivers, under stones; fairly common.

Trechus rubens.—Under turf stack, Glencaw mountain.

Hydroporus Davisii.—Common in slack water at foot of mountain rivers in company with *H. septentrionalis*. (I have never observed either of these species rise to the surface.)

***H. incognitus.**—Sweeping damp grasses, and in swamp, Culmore.

***H. melanarius.**—One specimen at Downhill, Co. Derry, by Mr. J. N. Milne.

***H. celatus.**—Downhill, taken by Mr. J. N. Milne.

***H. discretus.**—Common among weeds in early spring in muddy streams or semi-stagnant pools.

Agabus unguicularis.—In marsh at Culmore.

- Helophorus rugosus.**—Very abundant on sands at Magilligan and Buncrana.
- ***H. intermedius.**—In marsh at Culmore, not common.
- H. arvernicus.**—A single specimen from River Faughan.
- ***Henicocerus exsculptus.**—In company with *Hydrena*, River Faughan.
- ***Hydræna gracilis,**
H. atricapilla,
 ***H. pulchella,** } From weed growing on stones, River Faughan.
- Cercyon hæmorrhous.**—Two specimens in Donegal, probably overlooked.
- ***Tachyusa constricta.**—On sandy deposit on borders of River Faughan; plentiful where it occurs, but very local.
- ***T. flavitarsus**, var.—A new record for Ireland.
- Bolitochara obliqua.**—Abundant under loose bark of fallen fir trees, Kildery, Co. Donegal.
- Gymnusa brevicollis.**—Plentiful in marsh at Culmore under decomposing rushes, &c.; have not met with it elsewhere.
- ***Tachinus pallipes.**—Occasionally in moss, but attracted in numbers by carrion in woods.
- T. elongatus.**—One specimen on sands at Buncrana.
- ***Mycetoporus nanus.**—Magilligan sand-hills, not common.
- ***Habrocerus capillaricornis.**—A single specimen in March at base of oat rick.
- Quedlus scintellans.**—From carrion, not uncommon.
- Philonthus lucens.**—I have always found this in moss or under stones, never under carrion like *P. politus*.
- P. nigrita.**—In swamp at Culmore among decaying rushes, &c., and shore of Lough Enagh, Co. Derry.
- P. quisquiliarius.**—On sand-hills, Buncrana, Co. Donegal. The var. *dimidiatus* in swamp at Culmore.
- Xantholinus distans.**—On sand-hills at Magilligan and Buncrana; not uncommon.
- Bledius erraticus.** { Abundant in sands at Magilligan, the former
 usually occurs at a rather higher level than
B. longulus. { *B. longulus*.
- Ancyrophorus omalinus.**—In mossy bank, Culmore.
- Homalota halobrectha.**—Magilligan sands.
- ***Homalota montivigans,**
 ***H. fallaciosa,**
 ***H. hepatica,**
 ***Oxypoda hæmorrhœa,**
 ***O. brachyptera,**
 ***O. lividipennis,**
 ***Thinobius linearis,**
 ***Trogophlœus fuliginosus,** } All new records for Ireland.
- ***Trogophlœus linearis.**—Floating on water tub.
- ***Acidota crenata.**—On sandhills at Buncrana; not common.

Coryphlum angusticollis.—By sweeping in grass at Culmore. One specimen.

***Leptinus testaceus.**—Several examples from tunnel leading to nest of *Bombus terrestris*.

***Choleva chrysomeloides.**—In carrion; a single specimen occurred previously at Lough Neagh (Haliday), but was not recorded.

***Colin serripes,**

***C. angulare,**

***C. brunneum,**

} Taken by sweeping rushes.

Hister bimaculatus.—A single example taken floating on River Faughan, Co. Derry.

Actidium coarctatum.—A single example taken under stones, border of Calry River, Co. Donegal.

Hyperaspis reppensis.—One at Culmore among dry grass, and another at Kilderry by sweeping grass.

Micropeplus tesseraula.—Taken at Culmore, and given to me by Mr. J. N. Milne.

***Epuræa angustula.**—Three examples taken from borings of *Trypodendron domesticum* in fallen Beech tree, Glentocher, Co. Donegal.

***E. obsoleta.**—By beating Ivy, Kilderry.

***Antherophagus nigricornis.**—In nests of *Bombus terrestris*.

Cryptophagus setulosus.—In nests of *Bombus terrestris* and *B.*

C. distinguendus.) *agrorum*.

***Atomaria Wollastoni.**—From sweepings of barn after threshing and cleaning oats.

***A. peltata.**—From base of oat rick.

Parnus auriculatus.—Common under stones near water in early spring.

Elater pomorum.—Several taken running up stems of grasses, one specimen on Birch, Kilderry.

***Telephorus darwinianus.**—On grassy mounds slightly above high water mark at mouth of mountain rivers on north shore of Lough Foyle, a few examples under dry pieces of sea-weed, chips of wood, &c. in similar situations. Three examples were sent to me by Mr. J. N. Milne, which were taken on Black Brae embankment on the south shore of Lough Foyle by sweeping or beating. I find both light and dark varieties plentiful in its favourite localities. It appears towards the end of May. Mr. J. N. Halbert has taken it near Dublin, but it has not been found elsewhere in Ireland.

Rhaglum inquisitor.—Fairly abundant on Oak and Birch trunks in Walworth Wood, Co. Derry, in company with *R. bifasciatum*.

Lema septentrionalis.—Plentiful in July on young shoots of oats in company with its larvæ.

Chrysomela fastuosa.—Occurs on dead nettle. Mr. James Milne gave me a large series which he found floating in an eddy in the Redcastle River, Co. Donegal.

***Longitarsus ballotæ.**—A single example taken by sweeping grasses in July; possibly overlooked owing to its resemblance to *L. pusillus*.

- Cassida hemisphærica.**—One example by beating at Kilderry.
- ***Cistela luperus.**—A single example in sand-pocket at Magilligan during strong wind.
- ***Meloe proscarabæus**, var. **cyaneus.**—Thirteen examples on a sunny bank in March at Ballyargus.
- ***Rhynchites minutus.**—Beating at Culmore.
- Otiorrhynchus maurus.**—One example in Calry Glen, and a second at Kilderry plantation on grass near the shore; rare.
- O. auropunctatus.**—A single example; underground at foot of oak tree, near a privet hedge, Culmore.
- O. blandus.**—One specimen at Greencastle, Co. Donegal, and two at Magilligan, Co. Derry.
- ***Tropiphorus obtusus.**—A single example by sweeping at Kilderry.
- Polydrusus micans.**—Walworth Wood, Co. Derry; found it plentifully on two Hazel bushes, although Hazel is plentiful in the wood it appears to be confined to these two bushes.
- Sitones cambricus.**—Abundant near the shores of Lough Foyle.
- ***S. melloti.**—By sweeping grasses, Willsborough Level embankment, Co. Derry, one specimen from oat rick, Co. Donegal.
- Orchestes scutellaris.**—A large colony on Alder at Culmore.
- ***Anoplus roboris.**—Taken when sweeping for *Donacie* on wet boggy ground.
- ***Ceuthorrhynchus hirtulus.**—Single specimen on sand-hills at Buncrana.
- C. angulosus.**—Sweeping grasses at Culmore, one example only.
- ***C. viduatus.**
- Rhopalomesites Tardyi.**—Common in Donegal and Derry in Holly, Beech, Whitethorn, Willow, &c.
- Trypodendron domesticum.**—A small colony in a fallen Beech tree in valley of Glentocher, Co. Donegal.

I cannot conclude this list of Donegal and Derry Beetles without expressing my warmest thanks to Mr. J. N. Halbert¹, for the immense amount of trouble which he has taken in naming and verifying beetles for me, and for the many useful hints as to collecting which I have received from him during the past three years.

My thanks are also due to Mr. James N. Milne, of Culmore, who, during his fishing and shell-hunting excursions, so frequently collected and sent to me large numbers of beetles, among which were several rarities.

Chichester.

[¹ Dr. David Sharp, F.R.S., and Mr. G. C. Champion, F.Z.S., have very kindly named or verified many of Mr. Buckle's captures, especially in the family *Staphylinida*, submitted to them during the last three years.

ENTOMOSTRACA FROM LOUGH REE.

BY W. F. DE V. KANE, M.A., F.E.S.

[Collected on the Excursion of the Dublin Naturalists' Field Club, 1899.]

THE following results were obtained from about an hour's dredging in one portion of L. Ree, and chiefly in deep water. Only the most interesting captures are given. Several specimens of *Bythotrephes longimanus*, Lilljeborg, and *Leptodora hyalina*, Lilljeborg, occurred; these two remarkable species frequent large lakes. Dr. Creighton has met with the former in L. Melvin, and the latter near Galway. When the Athlone party broke up I proceeded to Mayo, and in L. Mask met with both, but at L. Carra only *Leptodora hyalina*. Both also occur at L. Gill, Sligo, and L. Neagh. In L. Erne the latter is found and a species of *Bythotrephes*, probably *B. borealis*, Sars., not hitherto taken in the British Islands. *Daphnia lacustris*, var. *galeata*, Sars., occurs plentifully in moderately deep water at L. Ree. The prevalent form is a most remarkable one and well worth figuring. The helmet-shaped head assumes the most grotesque forms, the beak being extremely prominent, a very convex projection in front of the eye, and the vertex spine long and sometimes curved forward into a hook-shape. When alive, the animals are remarkable for a very dark pigmentation about the head and the abdomen, which gives them a very speckled appearance in the water. The specimens figured by Prof. Brady in his monograph on British *Daphnia* published last year, from L. Oich and L. Attray, Scotland, are suggestive of those which I took at L. Ree, but are not in any way so grotesque. It is interesting also that I found the same species in L. Mask in extraordinary numbers, and of exactly similar character to those of L. Ree. I have taken *D. galeata*, Scourfield, also in L. Gill and in certain minor lakes in the County of Monaghan where they occur in scanty numbers accompanied by *D. longispina* and other common species, but presenting in every instance only the ordinary typical characters. The immature specimens taken at L. Ree and L. Mask are extremely variable, but not more so than is usual elsewhere, so far as I have examined. It is worthy of noting that this species, widely distributed in the lakes of Ireland and Great Britain, appears on the Continent to be

confined to Scandinavia, according to Brady. The excessive local variation which seems to obtain in this and allied species presents a problem well worthy of further research.

The only other capture worth noting was *Sida crystallina* which was plentiful among weeds at St. John's Point. The material, however, has been so far only cursorily examined, and there may be minute species yet overlooked worthy of record.

An attempt was made to collect in a very shallow lake near Clonmacnois, but owing to the boat having but one oar it was impossible to reach the deeper water, and *Eurycerus lamellatus* was almost the only species taken.

Drumreearke, Monaghan.

A COUNTY FAUNA.

Contributions towards a Fauna of Herefordshire—Mollusca.

By ARTHUR E. BOYCOTT and ERNEST W. W. BOWELL. *Woolhope Naturalists' Field Club*. Pp. 104, n.d.

Messrs. Boycott and Bowell's "contribution" is certainly the best paper on a county fauna we have yet seen. In many respects it even represents an ideal to be imitated by naturalists of other counties, and we strongly recommend its perusal to those intending to issue similar publications. Instead of the usual list of species, with long strings of Latin names indiscriminately applied to monstrosities as well as to individual variations in size, the authors give us carefully compiled lists of distribution of the species with regard to the principal geological strata, and they also take into consideration the anatomy and histology of the animals which they enumerate. There are some points, however, in which this little work might have been improved. Though it is acknowledged that the slugs have been practically left out, no reason is given for this singular omission. The chief defect, however, lies, in our opinion, in the nomenclature, which is almost bewildering in its novelty. After committing themselves to this statement (p. 21)—"Indeed, the more the matter is inquired into, the further one is driven from one's ideal of strict correctness and priority to the view that the best name is the one to which people are most accustomed and about the significance of which there is not much doubt" we find our familiar *Hyalinia crystallina* described as *Discus crystallinus*, *Helix rotundata* as *Pyramidula rotundata*, whilst our poor garden snail, *Helix aspersa*, becomes *Cryptomphalus aspersus*. To resuscitate such names as *Discus*, *Cryptomphalus*, *Amphibulina*, and *Theodaxus* seems to us objectionable and not even always in accordance with any rules of priority. It is a great pity that no reference is given on the paper as to the method and date of its original publication.

R.F.S

THE PALÆONTOGRAPHICAL SOCIETY IN IRELAND.

Monograph of the Carboniferous Cephalopoda of Ireland.

By ARTHUR H. FOORD, Ph.D. (Münch.), F.G.S. Part i. Family *Orthoceratidae* (in Part), pp. 1-22; pls. i.-vii., 1897. Part ii. Containing the families *Orthoceratidae* (concluding part), *Actinoceratidae*, *Cyrtoceratidae*, and *Poterioceratidae*, pp. 23-48; pls. viii.-xvii., 1898. Palæontographical Society.

In view of the possibility of establishing life-zones in the Carboniferous rocks it is necessary that the organic remains should be minutely described and accurately figured. Everyone specially interested in these rocks has felt the want of satisfactory figures and descriptions of the Cephalopoda and will therefore, we are sure, heartily welcome Dr. Foord's Monograph, which is appearing in the publications of the Palæontographical Society. Having previously worked through all the Nautiloidea in the British Museum collection, which contains a number of Sowerby's and of Phillips's type-specimens, Dr. Foord was eminently fitted to undertake such a Monograph. The two parts which have already appeared include the straight or only slightly curved Nautiloids, viz., *Orthoceras*, *Actinoceras*, *Cyrtoceras*, the new genus *Eusthenoceras*, and *Poterioceras*. The importance of the work will be at once apparent when it is stated that of the twenty-seven species of *Orthoceras* that are described, twenty are due to the author's researches, and are here figured for the first time in the admirable manner so characteristic of the publications of the Palæontographical Society. The differentiation of these comparatively straight forms is particularly difficult owing to the paucity of the specific characters, these being chiefly the rate of tapering, the shape of the transverse section, the form of the septa, the position and character of the siphuncle, and the nature of the ornaments of the test. New species of *Actinoceras*, of *Cyrtoceras*, and of *Poterioceras* are also described and figured. For the species from Oldtown, Queen's County, that De Koninck figured and described under the name *Cyrtoceras Hulli*, Dr. Foord proposes the new genus *Eusthenoceras*, a genus possessing characters which are intermediate between those of *Orthoceras*, and those of *Meloceras*, a subgenus of *Cyrtoceras*. Apparently the species is not very rare, and according to the author "the great size of the individuals belonging to this species is worthy of note, and did not escape De Koninck's attention in his description of the species. There were giants in those days in the Carboniferous seas of the British and Belgian areas; this may at least be said of the Cephalopoda, for not only did *Actinoceras giganteum* flourish and abound, but there were also gigantic forms of many of the coiled shells . . . Favourable environments, immunity from the attacks of their enemies, and other physical conditions may be invoked to account for such unusual development which was most marked in the Irish area." Although departing in some particulars from *E. Hulli*, Dr. Foord places provisionally in this genus the unique specimen from Samphire Island, in the County of Kerry, that De Koninck described as *Cyrtoceras Baillyi*. We heartily

congratulate the author on the result of his researches so far as he has made them known, and we look forward with interest to the rest of his Monograph dealing with the many interesting coiled Cephalopoda—both Nautiloidea and Ammonoidea—that have been found in the Carboniferous Limestone of Ireland.

GEO. C. CRICK

British Museum (Natural History), London.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Barbary Sheep from the Marquis of Hamilton, a Herring Gull from Mr. H. C. Hartnell, an Otter from Mr. C. Boyle, a number of Rudd from Mr. F. Godden, a Baboon from Captain Warren, a Giant Tortoise from the Hon. Walter Rothschild, a Sloth Bear from Mr. S. T. Loftus, eleven Tortoises from Mr. A. E. Jamrach, and a Dotterel from Mr. J. H. O'Connell.

5,527 persons visited the Gardens in November.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 16—The Club met at Leinster House.

Mr. G. H. CARPENTER showed *Isotoma brevicauda*, a new species of springtail from Franz-Josef Land. This interesting form will be shortly described and figured in the *Scientific Proceedings* of the Royal Dublin Society.

Dr. HENRY H. DIXON exhibited coccospheres. These minute organisms, the probable source of coccoliths, were found during last summer in Valentia Harbour. It is remarkable that while coccoliths are very abundant all round our coasts, coccospheres are extremely scarce—so far, some half dozen only have been recorded by Dr. J. Joly and the exhibitor from Weymouth and Dublin Bay.

Mr. M'ARDLE exhibited specimens of *Lepidozia Pearsoni*, Spruce, bearing the male spikes. The specimens were found by himself and the Rev. Canon Lett at Lough Duff, in the Brandon Valley, Co. Kerry, last May, when collecting for the R.I.A. Flora and Fauna Committee. The species resembles the pretty *Lepidozia reptans*, but has not the deep green colour of that species. It is of a pale tawny green, more slender and more elongated in growth, with more distantly placed leaves; which are cloven to beyond the middle into four to six subulate segments. The chief distinction is in the diœcious inflorescence the male spikes are terminal on the lateral branches. *Lepidozia reptans* is monœcious, the male spike springing from the underside of the stem—which is the normal position on nearly every other *Eulepidozia* known to us, except *Lepidozia Pearsoni*. This is the first record of the plant being found in Ireland. In North Wales it was collected by W. H. Pearson, at Tyn-y-groes, near Dolgelly, in 1877 and 1879. He has kindly verified the naming of this rare hepatic,

MR. HENRY J. SEYMOUR showed a number of gold specks obtained by washing alluvial sands in Co. Wicklow. One of the samples examined, a few ounces in weight, yielded about 15 specks of gold. The second sample was not so auriferous, but the specks were considerably larger.

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 13.—MR. F. J. BIGGER, M.R.I.A., occupied the chair. A discussion took place with reference to scientific and other objects exhibited, including some excellent bronze implements lately added to Mr. Milligan's collection from Lough Erne, &c. After the election of some new members, PROF. A. C. HADDON delivered a very interesting lecture on "Our Papuan Fellow-subjects at Work and Play," which was a descriptive account from personal observation of a stage of culture such as no doubt prevailed in Ireland before the introduction of Christianity. The lecturer dealt with the work of men and women and the games of children, as well as the physical features of the country and the towns and villages, including Port Moresby, the capital of British New Guinea. The manufacture of native pottery by women was very fully illustrated. This is altogether hand-made without a wheel, the result being very similar to the remains of ancient pottery dug from Irish graves and sand-dune settlements, such as we have in our Grainger collection. The lecturer also illustrated and described the making of native canoes from logs of wood, dug out with stone implements and the action of fire, such as was probably the origin of the dug-out boats in the Benn collection of the Natural History Museum, Belfast. Our crannoges, or artificial islands, so common in Irish lakes, were illustrated by the native pile dwellings that occur along the coasts at Bulaa and elsewhere. The construction of these villages was described in an interesting manner, and demonstrated the correctness of the accepted theories as to the origin of our ancient Irish crannoges. The process of making fire by the friction of pieces of wood was shown, and the method of tattooing as practised by the women. A number of games of Motee children were illustrated, such as cat's cradle, leapfrog, tug-of-war, and several that have no British equivalents. The natives of these distant islands attribute to supernatural agency or to the mighty deeds of their legendary heroes all special natural features in the landscape, such as rocks, mountains, etc., and the legends are carefully preserved and recited, as is common in Ireland still in remote places. Native shrines were shown, which are erected to secure success in fishing and cultivation of crops of fruit. At these shrines the natives' offerings are typically represented; for example, a basket of fruit is represented by a large shell holding a few stones. As in Ireland, upright stones of memorial frequently occur. Mr. Bigger, chairman, Messrs. Wright, Gray, and Patterson, discussed the merits of the lecture, referring to its many subjects of comparison with Irish customs in ancient times, and, on the motion of Mr. Wright, F.G.S., a very cordial vote of thanks was passed to Professor Haddon.

NOV. 21.—The President (Rev. C. H. WADDELL, B.D.) delivered a very interesting lecture on "The Work of the Club." After some introductory remarks, Mr. WADDELL stated that the object of a Field Club was to promote a study of nature among its members, to popularise such pursuits among the community and gain new disciples, and work out in detail the natural history of the district, placing the results on permanent record. Their Club was the oldest in Ireland, and they had no reason to be ashamed of the work already accomplished. The guide published in 1874 for the visit of the British Association summed up in an interesting manner what had been done up to that time. There were still, however, many gaps in the records of the natural survey of their district which should be filled up. The progress of science in all departments had been so great that it had become necessary for anyone who wished thoroughly to investigate any branch to become a specialist. For this reason, and also from the improvement in instruments of research, the older race of field naturalist was passing away. Our old naturalists of Belfast were "all-round men," such as Robert Patterson, who had done so much to promote natural history; John Templeton, of Cranmore, who set about the immense task of writing a complete natural history of Ireland; and William Thompson, who formed the same project for zoology alone, and carried it out to a great extent before his death. The ranks of this old type of naturalist should be filled up from the members of the Club. The attraction of work in laboratories and herbaria indoors, and the influence of the subjects taught now in our universities—structure, physiology, and microscopic work—were telling against work in the field. We need more life-histories of plants and animals, more monographs of single species or individuals, than monographs of groups and classes. There is work to be done on these lines of permanent interest and importance which cannot be done in the laboratory alone, but must be undertaken by the field naturalist. All that is required is, first, choice of a subject, then patience, observation, and the power to properly recording results. The true object of our favoured pursuits is not merely to collect specimens, but knowledge, to try to understand something of the varied and prolific life with which this world is filled, to study its origin, modes of development, and meaning. The members should remember the traditions of the Field Club and endeavour to extend its usefulness. The Society had always been a centre of progress and education in Belfast in all that relates to the love of nature, and the pursuit of those humanising and elevating studies which lead us to wonder even more and more at the greatness and goodness of the Creator. In conclusion, he said—May we seek then, in our communion with nature to be always learning at her feet, and to drink of her spirit, her infinite patience and calmness to soothe the impatience and restlessness of ours, her prodigality and kindness to give generosity to ours, her widespread beauty kindling into flame the admiration, wonder, and reverence of our spirits to ennoble and refine them.

A very animated discussion followed. Several members expressed a strong desire to have the lecture published. The possibility of rendering the Club's collection of books available for use was referred to,

and the desirability of having a set of the ordnance maps, geological maps, and geological memoirs provided for reference in the Public Library. As a free grant of these valuable documents could be had from the Treasury, no further time should be lost in securing them. The want of proper arrangement in the Public Museum was considered to be a very serious loss to popular education. It was thought desirable that the services of the members of the Club should be utilised in completing and arranging our local natural history and antiquarian collections. The meeting was closed by the election of some new members.

NOVEMBER 25. BOTANICAL SECTION.—The first meeting was well attended. After some notes on grasses collected during the season, Rev. C. H. Waddell gave an introductory lecture on the Cyperaceæ, the special subject chosen for study by the members of the section during the winter meetings.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

DECEMBER 5.—A lecture was given by ROBERT A. MITCHELL, LL.B. on "Personal Impressions of the Transvaal, Natal, and Cape Colony."

DUBLIN NATURALISTS' FIELD CLUB.

EXCURSION TO THE SHANNON.—Members of the Dublin Naturalists' Field Club spent June 27-29 in exploring the flora and fauna of the islands and shores of Lough Ree, with Athlone as a centre, finding many interesting specimens. On the first day, half an hour after arrival, the party left by sailing and rowing boats for Hare Island, where much of interest was seen. On the second day Quaker Island was reached by the steamer, the "Faerie Queen," and made the centre of explorations by row-boat, &c. The interesting Seven Churches were described in detail by Mr. J. F. Bigger, M.R.I.A., Vice-President of the Belfast Field Club. This member gave a similar treat on the third day when the remarkably fine ruins of Clonmacnoise were visited. Here, too, the party was hospitably entertained by Mr. and Mrs. J. W. Charlton, of Clonmacnoise House.

Praise is due to the Shannon Development Company for the way in which its officials worked to make the visit a success, some members complaining the visit was much too short for full enjoyment.

The botany of Lough Ree has been fully reported on by Messrs. Barrington and Vowell (*Proc. R.I.A.*, (2) iv., 1887). A number of the more interesting plants were seen. On Hare Island *Cephalanthera ensifolia* was gathered in abundance, with it were *Ophrys apifera* and *Teucrium Scordium*. On limestone rocks on the adjoining mainland Mr. Praeger gathered *Cornus sanguinea*, an addition to the Lough Ree flora. A halt where the lake narrows into the river above Athlone enabled the botanists to gather *Galium boreale*, *Lathyrus palustris* in great abundance and beautiful flower, *Lastrea Thelypteris*, &c. The Clonmacnoise district is bare and bleak; the most conspicuous plants were *Anthriscus vulgaris*, which grew in remarkable abundance on the eskers, and *Rhynchospora fusca*, which Mr. Praeger found in immense quantity in the bogs. On the fine ruined castle near St. John's Point *Orobancha hedere* was gathered by Mr. Kane.

A collection of the smaller fungi was made. The more interesting have been kindly identified by Dr. Plowright as follows:—*Uredo hypericorum*, *Stereum hirsutum*, *Hyposcyon fuscum*, *H. rubiginosum*, *Peziza virginea*, *Marasmius rotula*, *Agria punicea*, *Peziza trichispora*, *Menispora ciliata*, and *Æthaliium septicum*.

Ground beetles were abundant on Hare Island, though referable to but few species; the following occurred under stones on the lake shore:—*Elaphrus cupreus*, *Chelnius vestitus*, *Anchomenus albipes* abundant; *A. marginatus*, *A. viduus* var. *maestus*, very common, no specimens of the bronze-coloured type form of this species were observed; less common were *A. rufescens*, *Pterostichus vernalis*, *Harpalus rufibarbis*, *Bombidium rufescens*, *B. atrocaruleum*, and *Bradycellus distinctus*. In the weed-grown inlet at the landing-place, the following water-beetles were noted in company with many commoner kinds:—*Colambus v.-lineatus*, *Deronectes*,[†] *assimilis*, *D. depressus*, *Hydroporus lineatus*, and *H. umbrosus*. Numerous examples of *Orectochilus villosus*, and a few of the rare beetle *Philonthus quisquiliarius*, were disturbed from under stones at the water-edge. By sweeping, the following were found more or less commonly on the island:—*Telephorus thoracicus*, *Grammoptera ruficornis*, varying greatly in size: *Phyllodecta vitellina*, *Galerucella nymphaea*, *G. lineola*, *G. tenella*, and *Brachysomus echinatus*. Mr. Dillon found a beautifully fresh specimen of the local longicorn *Rhagium inquisitor*, along with the wood-boring beetle *Sinodendron cylindricum* in an old tree stump, and Mr. Cuthbert got *Rhopalomesites Tardyi* in Alder, an unusual home for this weevil.

On Inchcleraun Mr. Cuthbert collected three species of beetles of great interest, on account of their occurrence at such an inland locality; these are:—*Allocharya obscurella*, *Phytosus balticus*, and *Sitones griseus*. Up to this they had only been detected on the sea-coast. *Philonthus cephalotes*, *Bledius opacus*, and *Orchestes salicis* are also noteworthy from this locality, being somewhat local species. On Priest's Island the most interesting captures were *Cyrophana levipennis*, common in fungi; *Halysia conglobata*, *Epurea deleta*, *Anobium striatum*, *Elmis Volkmani*, *Chrysomela hyperici*, and several specimens of the rare weevil *Miaris campanulae* were swept off flowers, this being the second Irish record for this species.

Some interesting insects were found on the bog and meadow lands about Clonmacnoise, notably the following species of beetles:—*Euconnus hirticollis*, *Corticaria fenestralis*, *Chilocoris bipostulatus*, *Lema septentrionalis*, *Haltica ericeti*, *Phaedon cochleariae*, *Donacia impressa*, swept commonly off reedson the Shannon bank; *Eubrychius velatus* and *Lithodactylus leucogaster* in weedy drains; *Phytobius comari*, *Miaris campanulae*, &c. The stony shores of Fin Lough yielded three rather local rove-beetles i.e. *Lathrobium multipunctatum*, *L. terminatum*, type form, and *L. longulum*. Perhaps the most interesting insect captured near Clonmacnoise was a caterpillar of the rare noctuid moth *Dasytopia templi*, taken by Mr. Dillon and identified by Mr. Kane.

The Hymenopterous fauna was disappointingly scanty, owing principally to the broken weather. *Prosopis hyalinata*, one of the short-tongued bees of a genus very poorly represented in Ireland, was taken on Quaker Island

by Mr. Dillon. It is probably not uncommon, but hitherto had not been definitely recorded. *Psithyrus barbutellus*, an inquiline humble-bee, was taken on Hare Island, with the solitary species *Halictus albipes*, *H. villosulus*, and *Sphecodes similis*. *Formica fusca* was abundant on Hare and Quaker Islands, as also the races *ruginodis* and *scabrinodis* of *Myrmica rubra*.

Some solitary wasps, including *Psen pallipes*, *Pemphredon Wesmæli*, *Crabro varius*, and *Crabro leucostoma*, were taken under bark along the west bank of the river, south of Athlone.

Among the more interesting spiders collected were *Lycosa leopardus*, abundant on the islands of Lough Ree, and *Prosthesima luteitana*, of which a single female occurred on Hare Island. The latter is the first addition to Mr. G. H. Carpenter's list of Irish Spiders published in the *Proc. R.I.A.* (3), vol. v., 1898, pp. 128-210. A Report on the Entomostraca dredged during the excursion by Mr. Kane will be found on pp. 12-13 of this number.

The result of shell-hunting was a list of 44 species. Of these the most interesting were the large *Clausilia laminata*, of which a few were found in the woods on Hare Island, and *Hyalinia nitida*, which was very numerous round the shore of the same place.

Fossil-hunting was rewarded by the discovery of several forms which have been named by Dr. A. H. Foord. The species are represented mostly by immature specimens :—

BRACHIOPODA.—*Spirifera glabra*, Martin; *S. bisulcata*, Sowerby; *Orthis resupinata*, Martin; *Terebratula hastata*, Sowerby; *Rhynchonella cordiformis* (?), Sowerby; *Productus* sp.

IAMELLIBRANCHIATA.—*Leiopteria*, sp.; *Conocardium*, sp.; *Edmondia*, sp.

GASTROPODA.—*Loxonema*, sp.; *Enomphalus pentangulatus*, Sowerby.

NOTES.

ZOOLOGY.

INSECTS.

Insect Notes from County Antrim.

The Rev. W. F. Johnson's entomological notes in the December number are very interesting. My friend Mr. McCalmont found *Colias edusa* at Cultra in a clover field by the sea-shore. I found *Pyrameis cardui* and *P. atalanta* and *Hipparchia semele* on the wing in M'Art's Fort. I took the larva of *P. atalanta* at Giant's Ring and at Castlereagh, from which I reared out ten or twelve specimens. They commenced to emerge from the pupa on 7th October, when a few came out, the weather having changed; the remainder did not emerge until a week later; one was alive on 30th October.

The moth *Macroglossa stellatarum* I observed at the following places :— Newtownbreda and Campbell College, Belfast, and at Doagh, County Antrim—in all nine specimens.

H. L. ORR.

Belfast.

The Beetles of the Foyle District.

Mr. Buckle's captures from the Foyle district (p. 2-11) form numerically the largest local list that has hitherto been published on Irish beetles. Besides the many new records, he has been fortunate enough to re-discover several species, which have not been found in Ireland since their original discovery, many years ago, by Mr. Haliday. The following may be mentioned:—*Coryphium angusticollis*, *Choleva chrysomeloides*, *Actidium coarctatum*, *Micropeplus tessellatus*, *Antherophagus nigricornis*, *Parnus auriculatus*, &c. Three of Mr. Buckle's most noteworthy finds are—*Atomaria Wollertonii*, Sharp; *Telephorus darwinianus*, Sharp; and *Tropiphorus obtusus*, Bousd., species which for a number of years have been recorded only from certain Scotch localities. The *Telephorus*, however, occurs under sea-weed on the Dublin coast near Clontarf, so that in all probability it will be found widely distributed round the Irish coast. *Tropiphorus obtusus*, also, has been taken by the Rev. W. F. Johnson near Armagh, and by myself under moss, in spring, on the banks of the River Barrow, Co. Carlow. Dr. David Sharp, F.R.S., and Mr. G. C. Champion, F.Z.S., have very kindly named or verified a number of the species especially amongst the more critical *Staphylinidae*.

J. N. HALBERT.

Science and Art Museum, Dublin.

MOLLUSCS.

Reversed *Helix ericetorum*, at Bundoran.

A friend in Ballyshannon lately sent me some abnormal land shells, collected on the dunes between that town and Bundoran, by the old women who make the shell necklaces for sale at the latter place. Among them I find two sinistral specimens of the above, and some friends, who have passed some hundreds of reversed specimens of *H. nemoralis* from the same locality through their hands, tell me they have never seen such "sports" of *H. ericetorum* before.

Belfast.

R. WELCH.

BIRDS.

Montagu's Harrier in Wicklow.

An immature male Montague Harrier (*Circus Montagu*) was shot near Kylebeg, Blessington, Co. Wicklow, on the 7th of September, probably belonging to the same brood as those obtained in Co. Wexford in the month of August.

EDWARD WILLIAMS.

Bewick's Swans in the Moy Estuary.

On the 12th of December, 1899, a herd of twenty Bewick's Swans (*Cygnus Bewicki*) visited the estuary, and rested for some hours on the Bartragh sands, opposite Moyne Abbey. One fine bird was obtained, it measured 3 feet 9 inches from point of bill to end of tail feathers, and weighed 14 lbs. The entire herd appeared to be adult birds, for there were no grey ones amongst them.

ROBERT WARREN.

Moyview, Ballina,

Ospreys in Ireland.

* A very fine female Osprey, *Pandion haliaetus*, was shot in the neighbourhood of Cahir, Co. Tipperary, on the 10th of October. It was in company with another which fortunately eluded all efforts to capture it. The bird measured five feet from tip to tip of wing. Mr. Byrne, the gamekeeper at Glendalough, writes to inform me that he has seen one on several occasions about the Glendalough lakes this last month, a locality which seems very suitable to their habits, as another was obtained there a few years ago.

EDWARD WILLIAMS.

Dublin.

Rose-coloured Pastor In Co. Mayo.

On the 5th of last November a fine specimen of this rare visitor (*Pastor roseus*) to Ireland was shot by Mr. James A. Knox, at Belgariff House (near Foxford), as it was feeding by itself on the lawn there. It was not in very good plumage, for some feathers on the back of its neck were not fully grown, nor had the long tail feathers attained their full length. This is the third specimen obtained in Ireland this year. Mr. D. C. Campbell, of Londonderry, noticed in the August number of the *Irish Naturalist*, 1898, a specimen having been shot on the 9th of June by Mr. John Hunter, near Inch, in that county; and Mr. Williams, of Dublin, in the *Irish Naturalist* for October, 1898, records the capture of a specimen shot on the 20th of July by Mr. A. Brooke in his garden near Killybegs, Co. Donegal.

ROBERT WARREN.

Moyview, Ballina.

This specimen was a female, and the stomach contained a quantity of small beetles mixed with a few berries of the common Privet. This being the third specimen recorded this year in Ireland, we shall probably hear of a westward migration on the Continent.

EDWARD WILLIAMS.

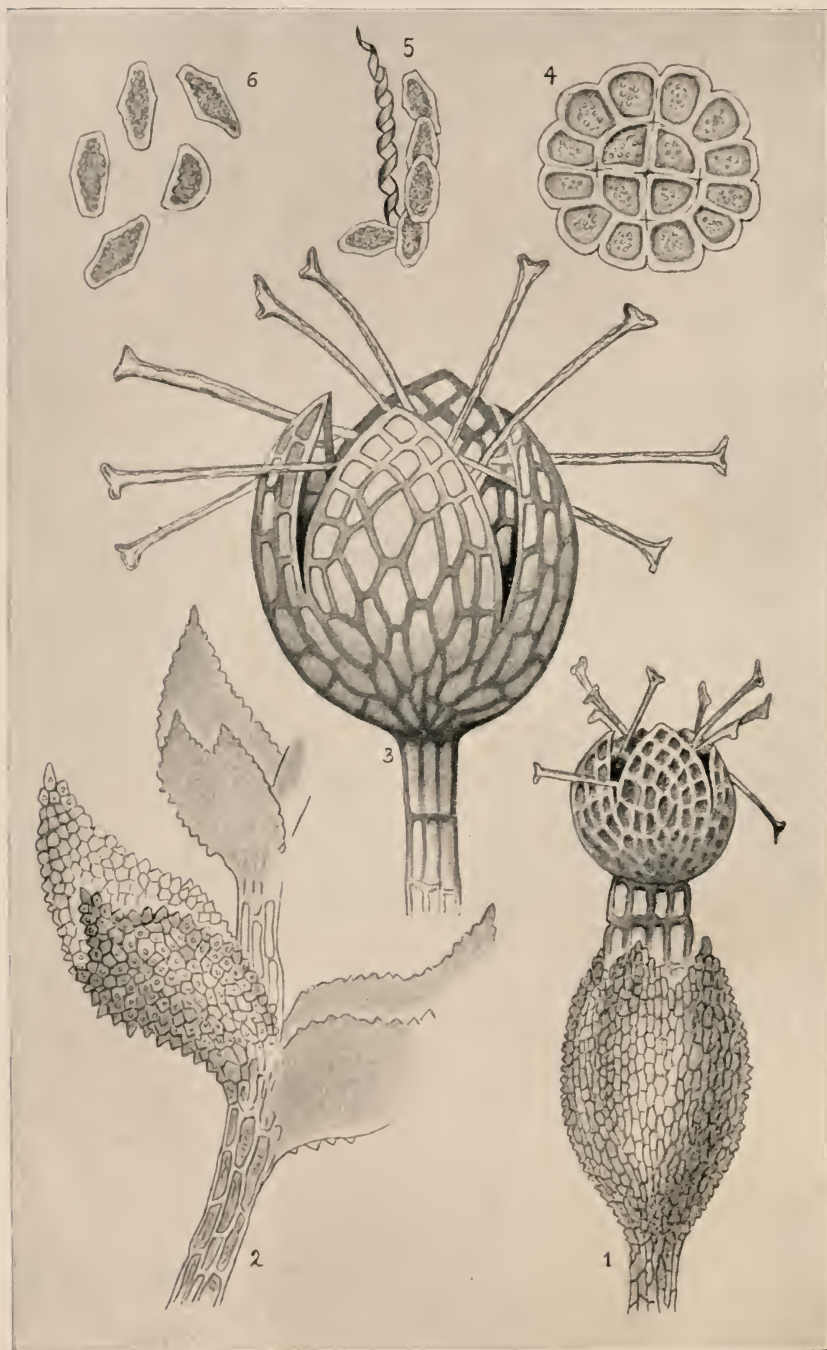
BOTANY.

Flora of Co. Armagh.

Mr. H. C. Hart writes me that he has a specimen of *Hieracium murorum* L., var. *pellucidum* Læstad (so named by Mr. Hanbury), collected at Dobbins' Walk, Armagh. No Hawkweed (except *H. Pilosella*) has been recorded from Co. Armagh previously, and the species is also an addition to the flora of District X.

R. LLOYD PRÆGER.

Dublin.



LEJEUNIA ROSSETTIANA, MASS.

To face p. 23.]

[W. N. Allen, ad nat. del.]

THE HEPATICÆ OF ROSS ISLAND, KILLARNEY.

(Collected for the R.I.A. Flora and Fauna Committee.)

BY DAVID M'ARDLE.

PLATE I.

ROSS ISLAND, with its historic castle, a fortress of about the fourteenth century, is in a beautiful wooded district, eastward about two miles from Killarney town. The deep water-course and drawbridge, which once guarded the entrance to the castle, have disappeared; and the 150 or more acres, which extend in an erratic manner into Lough Leane, now a form peninsula. It is well wooded and tastefully laid out, well-kept walks leading to places at the lake margin, where the best views of the islands and surrounding woods and mountains are to be obtained. The place is full of interest to the antiquarian. From its sheltered position, &c., it was selected by Mr. G. H. Carpenter and myself as a likely place for rare insects and hepatics in November, 1893; and in May last year I spent a day there with the Rev. Canon Lett collecting Hepaticæ; the result of our collecting is in the appended list.

In 1889 Mr. R. W. Scully, F.L.S., when collecting Hepaticæ at Killarney, visited Ross Island, and among part of his collection which he sent to me I found a small quantity of the rare *Lejeunea Rossettiana*, which he collected there. This I sent to my late friend, Dr. Spruce, who verified my name for the plant, which was not in fruit, and I might have passed it over for *Lejeunea echinata* were it not for an excellent figure and description of *Lejeunea Rossettiana* published by Mr. Pearson in the *Journal of Botany*, vol. 27, p. 352, tab. 292, 1889. We were fortunate in finding the plant there last May in perfect condition. I am not aware that the ripe capsule, its curious structure and contents, have been seen or described by any writer on these plants. In my endeavour to demonstrate them I have been ably assisted by Mr. W. N. Allen, whose beautiful delineation of these parts, which he drew from the specimens we gathered on Ross Island, renders the task a pleasant one.

The name was given to the plant by an Italian botanist, Professor Massalongo, to perpetuate his friend Dr. Rossetti, who collected it in Italy. In England it is known to grow in two localities—Derbyshire, where it was collected by Mr. G. A.

Holt, and in Yorkshire, by the late Dr. Carrington, who also succeeded in finding it in Muckcross demesne, Killarney; it was found near Dublin by Dr. Taylor, in 1830, but has not been rediscovered in the last two stations.

Frullania tamarisci, Linn., Dumort.—Common on trees and on rocks—D. M'A., 1893; Lett and M'A., 1899.

var. **atrovirens**, Carrington.—Stems elongated, leaves elliptic-ovate, apiculate, inflexed, indigo green colour. On wet rocks, margin of the lake—Lett and M'A., 1899. Rare.

Frullania germana, Taylor.—On the trunks of trees—D. M'A., 1893; Lett and M'A., 1899.

Frullania microphylla, Gottsche, Pearson.—On the smooth bark of trees—Lett and M'A., 1899.

Frullania fragilifolia, Taylor.—On trees—Lett and M'A., 1899. Rare.

Frullania dilatata, Linn., Dumort.—On trees—D. M'A., 1893; Lett and M'A., 1899.

Lejeunea Mackai, Hook.—Plentiful on the bare rocks and on stones by the lake margin, where it becomes dark-coloured, nearly black—D. M'A., 1893; Lett and M'A., 1899.

Lejeunea ovata, Taylor.—On the trunks of trees, among *Metzgeria furcata* and *Porotrichum alopecurum*—D. M'A., 1893; Lett and M'A., 1899.

Lejeunea serpyllifolia, Dicks.—On damp stones near the lake and among mosses on trees and on damp banks—D. M'A., 1893; Lett and M'A., 1899. Common.

var. **heterophylla**, Carrington.—Very fragile; branches attenuated, microphyllous. Leaves plane, distant, variously shaped, lobule obsolete or not. On a wet, peaty bank—Lett and M'A., 1899.

Lejeunea flava, Swartz.—On the trunks of trees among *Metzgeria furcata*—D. M'A., 1893; Lett and M'A., 1899. (Rare.)

Lejeunea patens, Lindberg.—On decayed wood—D. M'A., 1893; Lett and M'A., 1899.

var. **erecta**, M'Ardle. *I. Nat.*, 1894, p. 139. Very rare.

Lejeunea hamatifolia, Hook.—On the trunks of trees—D. M'A., 1893. On *Frullania tamarisci*—Lett and M'A., 1899.

Lejeunea Rossettiana, Massal. (Plate I.) Pearson in *Journal Bot.*, vol. 27, p. 352, tab. 292, 1889. *Hep. Brit. Isles*, p. 60, plate 17. Massalongo, *Nuovo Giorn. Bot. Ital.*, vol. 21, p. 487, 1899. Very rare—Mr. R. W. Scully, 1889. On the decayed stems of *Erica* and on damp peat—Lett and M'A., May, 1899.

Plant minute, intricately caespitose, very fragile, of a yellowish green colour. Stems sub-pinnate, with fasciculate or simple pale rootlets. Leaves imbricate, patent, more distant on young branches, bi-lobed, antical lobe convex, ovate, apex acuminate incurved, upper surface

beautifully echinate, postical lobe (lobule) about half the size of the antical (lobe), subquadrate to roundish-quadrate, tumid at the keel, upper portion plane, margin not incurved, dentate-spinulose, exterior surface echinate like the antical lobe, texture opaque, cells minute, walls distant, papillæ conical, one to each cell. Stipules absent, and the styliform appendage also. Female flowers on short branches subtended by an innovation. Bracts similar to the leaves, only larger, postical lobe with margin more finely dentate, spinulose. Bracteole wanting. Perianth projecting more than half beyond the bracts, ovate to pyriform, upper portion five-angled, epidermis muricate, stalk of the capsule about four cells thick, short, hyaline, very fragile, spherical, keeled, splitting into four valves for about two-thirds. Cell walls thick, somewhat alveolate; valves ciliated, three or four to each, hyaline, about as long as the capsule, angled at the apex, highly hygroscopic, intertwined in a remarkable manner, confining the valves of the half-opened capsule, and held in position by the angular apex of each cilia, which conveys moisture to the membranous capsule and spores; they are formed from the archisporium or inner lining of the capsule, fugaceous on ripe capsules. Spores oblong-deltoid, large for the size of the plant, of a dark green colour. Elaters few, bi-spiral, attached to the spores. Mother-spores few, in plates in base of capsule, each surrounded by an undulating ring of delicate tissue, the archisporium, which encloses near the margin about twelve spores, and four in the centre, through all of which it alternates. The young spores present two forms, oblong-cuneate and oblong-elongated; they are of a bright green colour, with delicate granulose markings.

Lejeunea minutissima, Smith.—On the trunks of trees among mosses and *Metzgeria*—D. M'A., 1893. On *Frullania microphylla*—Lett and M'A., 1899.

Lejeunea ulicina, Taylor.—On the trunks of trees—D. M'A., 1893; Lett and M'A., 1899.

Radula complanata, Linn., Dumort.—On trees; common. A very minute and fragile form, of a light yellow colour; grows among *Metzgeria*, but affords few, if any other characters to separate it.

Kantia trichomanes, Dicks.—On damp banks; common—Lett and M'A., 1899.

Kantia arguta, Nees.—On clay banks—Lett and M'A., 1899.

Lepidozia reptans, Linn.—On damp, peaty soil—Lett and M'A., 1899.

Lepidozia setacea, Web.—On damp peat; common—Lett and M'A., 1899.

Cephalozia bicuspidata, Linn.—On damp banks; common—Lett and M'A., 1899.

Cephalozia divaricata, Sm.—On damp peat; common—D. M'A., 1893; Lett and M'A., 1899.

Scapania resupinata, Linn.—On rocks and banks; common—Lett and M'A., 1899.

Diplophyllum albicans, Linn.—On rocks and banks; common—Lett and M'A., 1899.

Lophocolea bidentata, Linn.—On damp banks and on decayed wood; common—Lett and M'A., 1899.

Plagiochila asplenoides, Linn.—On damp banks—Lett and M'A., 1899.

var. **humilis**, Lindenb.—Shoots attenuated; leaves ovate, entire, obtuse or emarginate. On a damp bank—D. M'A., 1893.

var. **devexa**, Carrington.—Shoots compressed, circinate at apex, $1\frac{1}{2}$ inches long, furcate; leaves secund, roundish, ciliate-dentate, closely imbricate, erect, dorsal margin straight, recurved, ventral projecting backward so as to form a crest with the opposite leaves. On shady banks close to lake—D. M'A., 1893.

var. **minor**, Carrington.—Shoots $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, apex decurved, caespitose; leaves erecto-patent, sub-sekund, roundish, margin reflexed, ciliate toothed, entire or emarginate—Lett and M'A., 1899.

Plagiochila spinulosa, Dicks.—On shady banks; common—Lett and M'A., 1899.

Pellia epiphylla, Linn.—Common on damp banks—Lett and M'A., 1899.

Metzgeria furcata, Linn.—On the trunks of trees; common—D. M'A., 1893; Lett and M'A., 1899.

Metzgeria conjugata, Lindberg.—On trees; fertile—D. M'A., 1893; Lett and M'A., 1899. Differs from all the known species by its monœcious inflorescence. See M'Ardle "On the Musci and Hepaticæ of the Co. Cavan." *Proc. R.I.A.*, ser. 3, vol. iv., 1898, plate 22.

Riccardia multifida, Linn., Dill.—In boggy places; common—D. M'A., 1893.

Lunularia cruciata, Linn.—On wall-tops, banks, and on the pathways—D. M'A., 1893.

Conocephalus conicus, Linn.—On banks and rocks near the quay—D. M'A., 1893.

DESCRIPTION OF PLATE I.

Lejeunea Rosssettiana.

Fig. 1. Perianth and capsule, $\times 100$.

Fig. 2. Portion of stem and leaves, $\times 100$.

Fig. 3. Capsule showing dehiscence and the hygroscopic cilia, $\times 250$.

Fig. 4. One of the mother-spores, $\times 200$.

Fig. 5. Elaters attached to spores, $\times 250$.

Fig. 6. Spores fully developed, $\times 250$.

Royal Botanic Gardens, Glasnevin.

REMARKS ON THE SECOND EDITION OF "CYBELE
HIBERNICA," ESPECIALLY WITH REFERENCE
TO THE FLORA OF CO. DONEGAL.

BY H. C. HART, B.A., F.L.S.

THIS admirable and much-needed volume has been brought out with the most painstaking care, and will long remain the standard work of reference upon Irish topographical botany. The laborious research involved in the verification of the 1st Edition records has been undertaken conscientiously, together with the sorting and inclusion of a vast amount of original material. Considering the difficulties arising out of the sifting of evidence, the interpretation of dubious information, and the unravelling of problems arising out of what must have been a wide and varied correspondence, the wonder is how few errors there are to be detected.

There are, however, a few, which may as well be at once pointed out, and there are also a few positions taken up by the authors upon which I wish to comment. But especially I think it will be useful to summarize certain additions and alterations, in connection with the flora of Donegal, which my recent researches have enabled me to make. These are, it is true, to be found in my recently published *Flora of Donegal*, which did not appear in time to be utilized for the purposes of this volume, but they will be conveniently rehearsed in separate form.

Up to the date of the death of my lamented friend, Mr. A. G. More, I had furnished him for the purposes of this volume which he unhappily did not live to complete, with all my notes and specimens from Donegal. Since that time (1895) I have published nothing, save a few stray notes on the subject.

There are several new departures. One of these, the insertion of Irish plant-names, will be of much interest to a certain class of readers. It is to be hoped it will induce some competent student to take up the subject with thoroughness. The editors have, as they themselves admit in the Introduction, attacked the subject merely tentatively. An explanation of such names, together with collections not merely from existing dialects, but from such writers as Threlkeld, K'Eogh,

&c., would be of immense interest and form a large and valuable philological (as well as botanical) study. I have myself collected without difficulty, though at a considerable expense of time and travel, a large number of Celtic plant-names in Donegal which do not appear in the *Cybele*. Many will be found in an appendix to my *Flora of Donegal*. In most cases the people, whether Irish-speaking or not, know no English name for the plants.

It seems to me, however, that the method of excessive syllabication adopted here is a mistaken one. It gives the words an invertebrate, unharmonious appearance, and tends to induce one to pronounce them disjointedly, very much at variance with the euphonious glibness of the native. Irish words as usually spelt in Threlkeld, O'Reilly, Cameron, Joyce, or Stokes, seem to me much easier to master.

I will now make some remarks on passages in this volume, in the order in which they occur.

On page xxvi. is omitted "Donegal Plants," *Journ. of Bot.*, 1896, p. 399, under "Hart, H.C.," a paper which is referred to subsequently several times.

At page xl. it is contended that the rainfall in Kerry is at a maximum, Valentia being quoted in proof for six years (1890-1895), an insufficient period, with a mean of 53·6 inches. Dunmanway, in Cork, has a wetter mean, 66·23 inches. But what I wish to observe is that Connemara is, so far as our knowledge goes, far and away wetter than the south-west (unless at altitudes unsuitable for comparison). Kylemore, in Connemara, has a mean of 81·79 inches for 16 years. Symons' *British Rainfall* is of course the authority on such subjects. No doubt there are valleys in the Kerry Reeks, that would perhaps eclipse Connemara, but we have not got the proof. Indeed the mean at Killybegs, in Donegal, for nine years, exceeds the Valentia record quoted above by about four inches.

On the following page (xli.) the first British type plant quoted as absent from Ireland is *Helianthemum vulgare*. This I believe to be a misstatement. I will refer to the question later on.

In enumerating the Highland type plants (p. xliv.), it seems a pity to exclude such thoroughly representative plants, sub-

species though they be, as *Aira alpina*, *Cochlearia alpina*, *Saxifraga hirta* and *S. grænlantica*. These are confined to and most characteristic of our scattered mountain-groups, and are clearly remnants of an ancient flora. Why should our mountains be deprived of the credit thereof?

On the following page (xlv.) there is a list of the plants of this group which descend in Ireland to, or almost to, sea level. This is a very imperfect list. It should contain also *Saxifraga oppositifolia*, *Arctostaphylos Uva-ursi*, *Isoetes lacustris* and *Carex aquatilis*. These all descend to sea-level in several places in Donegal, and the last three elsewhere in Ireland. These facts I have recorded in a paper on altitudes¹ which has been largely made use of, I am pleased to observe, in this volume—all except *Carex aquatilis*, which was not then known as an Irish plant. And these facts are duly recorded in their proper place under the plants themselves in the body of the work. To these may also be added several of the Donegal *Hieracia*. *Carex aquatilis* is found only at low levels. At Doochary Bridge, in Donegal, two forms of this sedge are almost, if not quite, within the influence of exceptionally high tide.

In the list of Scottish (and Intermediate) type plants (p. xlv.), there should be included several *Hieracia*. *H. Schmidtii* is of this type, according to the editors' subsequent classification. This genus is especially well represented in West Donegal over a district extending from Sheephaven to Donegal Bay. Several of them occur along the rivers at low levels, and they especially predominate (as at Carrick) in the lowest reaches along the immediate banks or margin of the water, giving one far more the impression of, and associating with, Scottish type rather than Highland type plants. In this list of Scottish type, an asterisk plant like *Myrrhis odorata* is out of place. It is certainly not a native.

From the Atlantic type list (p. xlvii.), two very important plants are omitted; the Irish Spurge and the Killarney Fern. Nor can I find them classified in any of these preliminary analyses. Both are subsequently classified as Atlantic. The latter of these two was similarly unaccountably omitted in the original edition.

¹ On the Range of Flowering-plants and Ferns on the Mountains of Ireland. *Proc. R.I.A.* (3), vol. i., pp. 512-570.

On page 1. we come to a real *casus belli*, the question as to whether our most tender species have existed throughout the Glacial Period in Ireland. I, for one, have always given this question an unhesitating "no," viewing it as a matter of practical experience, rather than a question to be decided by geological theories. However, the argument goes merrily along. It would be well to submit it to arbitration, or to take a vote upon the question amongst those competent to form an opinion, the minority to abide (outwardly at least) by the decision of the majority. Those who have botanized in the Arctic Regions, and also among the "Cantabrian Group" (*Saxifraga umbrosa*, *S. Geum*, *Arbutus Unedo*, *Pinguicula grandiflora*, *Daboecia polifolia*, *Erica mediterranea*, *E. Mackaii*), especially practical horticulturists, will, I imagine, vote mostly in the negative. It is not necessary to limit the consideration of this subject to those few species (seven) of the so-called Cantabrian Group (p. xlviii.), whose chief peculiarity, as distinguished from several more, is the accidental one that they do not now exist in the neighbouring island. It is most probable they did, when they and their congeners thrived in a climate that suited them far better (or at least allowed them a wider range) than the present climate does. Who can doubt, on meeting a stray, dwarfed patch of Killarney Fern in Donegal, or an outlying settlement of Irish Spurge or *Bartsia viscosa* in the same county, but that these were at one time portions of a connected chain? And this Cantabrian Group is the still more reduced remainder of a widespread flora. No matter how the arrival of these plants be explained, it seems to me a sheer impossibility to suppose such organisms as these could have withstood so rigorous a condition of things. The Killarney Fern can, ranging as it does to Sierra Leone, stand great extremes of temperature, but its limit at the cold end of the range is reached here, or in the similarly-climated west of Scotland. I find more difficulty in establishing it in the open than any of its western neighbours that I have experimented upon. The Irish Spurge, Large-flowered Butterwort, and Mediterranean and Connemara Heaths will make themselves at home in Donegal without cultivation. Therefore I take this fern as a chief stumbling block to the Pre-glacial theory. *Arbutus Unedo* is another which has reached its limit of climatic

severity. One of the Cantabrian seven is quite out of place in the group, so far as vertical distribution goes. I mean London Pride, which seems to be able to exist amongst alpine, stand anything in fact. In Donegal its range is Highland.

Sir Charles Lyell says "the signs of glacial action have been traced by Professor Jukes to elevations of 2,500 feet in the Killarney district—the whole island was, in some part of the Glacial Period, an archipelago."—(*Antiquity of Man*, p. 271).

Let us question one or two more authorities before we leave this debatable question, which it was almost a pity to raise at all in the *Cybele*.

Professor James Geikie says "with glacial conditions in Scotland and the hilly grounds of England and Ireland, neither temperate flora nor fauna could have existed in this country."—(On Changes of climate during the Glacial Epoch; *Geol. Magazine*, vol. ix., 1872).

This question is akin to others in various parts of Europe, many of which can be explained by the, I believe, admittedly reasonable supposition, if not demonstration, of an upheaval (consequent upon the removal of the superincumbent mass of ice) of the continents accompanying the warmer period which caused that removal. Kerner says "The most noteworthy inference made in this connection is that over a great part of Central Europe *since the last ice-age*, a flora was evolved which was only capable of existing under the influence of a continental climate of far greater warmth than now prevails." (*Natural History of Plants*, ii., 903).

It is, I believe, an admitted fact amongst geologists, that at the deposition of the Estuarine Clay, long subsequent to the close of the Glacial Period, a fauna prevailed along our coasts of a milder form and more southern aspect than that now existing.

The flora of the Dead Sea, another warm group, detached by many degrees from its natural home, and incapable of existing there when Syria was glaciated and the Jordan an icy stream, is a case of similar origin.

In a recent and elaborate paper by Dr. Scharff (*Proc. Roy. Ir. Acad.*, July, 1897), "On the Origin of the European Fauna," the author labours hard to substantiate the Pre-glacial theory. Many of his arguments appear to me to be built upon insuffi-

ciently matured and established theories, derived from continental palæontology. Others of his views are hardly tenable, as for instance where he supports his theory of the lines of ancient arrival of our boreal species to Ireland by the following remark :—"The northern animals and plants undoubtedly came across from Scotland, and in the County of Londonderry, which part of modern Ireland they first touched, they are still more common than in any other portion of the country" (p. 440, *et supra*). The last portion of this statement is unfortunately quite erroneous so far as plants are concerned. In my *Flora of Donegal* I show that Derry has eight Highland, Scottish and Intermediate type plants not in Donegal ; while Donegal has eighteen (omitting *Hieracia*) not in Derry. And Derry would suffer perhaps equally by a comparison with Antrim. It is true that this is not a vital part of the argument, but so far as I can gauge the intention, it is supposed to have some effect.

I do not think the editors of the *Cyclops* have materially benefited their cause. On page xlv., when speaking of our most ancient flora (as I believe it to be), that of the Highland type, it is remarked that it may be regarded as having maintained itself "chiefly along the western Atlantic seaboard, where the climatic conditions were probably most favourable during the last Glacial Period." This is a reasonable assumption and may be correct, although I think it is safer to suppose they followed the retreating ice from the more southern latitudes, or the mountains of those latitudes, to which they had been banished. But it is an accurate idea, and is exactly what the very same species are doing at present in North Greenland, along its coasts.

But when we find on page 2 (speaking of the Cantabrian Group), of "their survival in Ireland . . . throughout the Glacial Period . . . in some favoured spots along our western seaboard," one begins to contemplate the assemblage of forms in these favoured spots with the keenest interest and wonderment. Here we have the very hardiest and the most delicate members of our flora occupying identical situations, say at the foot of the glacier or along the inner margin of the ice-foot, with the most reckless disregard for their natural requirements.

The question becomes hopelessly involved when regarded from the geological point of view. It is better to let the plants

speak for themselves in the first instance. They know, and they will tell no lies. Consequently it is our business to harmonize our geological theories with the truth, and not to distort the evidence of our senses so as to fit it into some formula which is largely hypothetical perhaps, and which should at once give way to the incontrovertible laws of nature. The above condition of things does *not* occur in North Greenland, nor would it, I imagine, be easy to produce a parallel.

On page lv. and lvi. two interesting lists are given of western plants, not found east of Long. 8° W.; and of eastern plants, not found west of Long. 7° W. To the former of those may be added *Allium Babingtonii*, east of Long. 8° (in Donegal); and to the latter may be added the following from Donegal localities which were not known to the authors:—*Thalictrum dunense*, *Hieracium strictum*, *H. auratum*, *H. corymbosum*, *Myosotis collina*, and *Equisetum Moorei* (which many hold as inseparable from *E. trachyodon*, which occurs in the west). On the same page (lvi.) several Donegal Hawkweeds may be added to the “northern plants.”

I omitted to call attention to another sad conclusion on pages xxxix.–xl.; the great god Pan is dead! The Gulf Stream is no more. Our valued friend is taken from us, and we receive nothing but vapour in exchange for the loss. This is the decision of the “best authorities.” But I find the tradition lingering along in great force in Dr. Murray’s articles, “Atlantic” and “Gulf Stream,” in Chambers’ *Encyclopædia*, 1890, and I have just read with keen delight the paper on “Oceanography of the North Atlantic,” communicated to the *Geographical Journal* (November, 1898) by that enthusiastic oceanographer, the Prince of Monaco. He still believes in the Gulf Stream, and recently, in another communication of his, he did Donegal the honour to place its course (that of the stream) in closer juxtaposition to it than to any other part of Ireland, a conclusion he arrived at by his elaborate and costly scheme of Atlantic floats. Further north it impinges closely upon the Scottish Hebrides. His words are “This vortex begins towards the Antilles and Central America with the Gulf Stream, which issues from the Gulf of Mexico, and with the equatorial current; passing the banks of Newfoundland at a tangent, it turns to the east, approaches the European coasts, and runs southwards from the Channel to Gibraltar. A wide branch

runs along the western coast of Ireland and of Norway, as far, at least, as Cape North. 'The centre oscillates somewhere to the south-west of the Azores.' This is the conclusion of the latest of one of the "best authorities."

On pageslxviii.,lxix., we read of DistrictXII.(Antrim,Down, and Derry,) "though by its position not on the whole so northern as District XI. [Donegal], the flora of this district has perhaps a more northern character. It has, indeed, but 29 Highland type plants to 30 in Donegal; but this deficiency is counterbalanced by the greater number of its *Hieracium* species and forms, and of its Scottish and Intermediate type plants, which may be taken as representing the boreal element in our flora. Out of a total for all Ireland of 29 species and forms of *Hieracium*, District XII. has 26 against 15 in Donegal, while the number of the Scottish and Intermediate type plants taken together is 49 in XII, to 43 in XI., out of a total of 60 for all Ireland." These statements are erroneous, as examination of my *Flora of Donegal* will show. There are eleven northern Hawkweeds in Donegal which do not occur in the north-east, while the north-east can claim only five northern forms absent from Donegal. The absence of *Hieracium murorum* and *H. boreale* forms from Donegal is quite in accordance with their non-northern character. Donegal, in fact, is an easy winner in northern *Hieracia*, so the argument on page lxix. may be transferred to the other side. *H. prenanthoides* (if it has been correctly determined) is the only important absentee from Donegal.

It is to be hoped the herbarium specimens of the earlier *Hieracia* records have been submitted to recent experts, otherwise it is a misfortune that so many of them have been admitted to the *Cybele*; and it would seem probable that identical forms appear under different names.

So far as my species and forms go, I have adopted the *Hieracia* of the *London Catalogue* (ninth edition.)¹

¹ There is one serious objection to limiting British Hawkweeds to Sir J. Hooker's classification. Since that was issued an industrious band of botanists have worked out districts in Scotland (to say nothing of Ireland and England), which were wholly unexplored. The result has been that many forms unknown to occur in these islands, new forms and continental forms, have come to light. Is our flora to be excluded from the benefit of these ?

Before leaving the subject of the headquarters of boreal groups of plants in Ireland, I have a few more words to say. Even though there be a superiority in species in the Scottish group in the north-east, the superiority is often the other way in the abundance of individuals, which is a surer criterion, perhaps, than scattered remnants of a failing or at any rate a rare flora. This would apply to *Prunus Padus*, which the editors represent as “apparently decreasing”; it is locally common in Donegal, even abundant in several places; to *Ligusticum scoticum*, much commoner from Inishowen to Dunfanaghy; to *Lobelia Dortmanna*, “apparently decreasing” in the north-east; to *Carex limosa* and *C. filiformis*; but more especially to the Highland group, such as *Saxifraga stellaris*, *S. oppositifolia*, *Saussurea alpina*, *Arctostaphylos Uva-ursi* (not seen in Antrim since 1837) *Salix herbacea*, *Carex rigida*, and *Isoetes lacustris*, which are, considering their requirements, fairly frequent, and some even common, in Donegal; but of rarity greater or less in the north-east.

If I were to select places in Ireland, conveying an idea of the most northern (Highland) assemblages of plants, I would place them in the following order, premising that there is a long gap between the first two and the following habitats:—

1. Slieve League in Donegal.
2. Ben Bulbin, Co. Sligo; and the groups (Anna Coona, Truskmere, &c.) around.
3. Muckanaght, Co. Galway.
4. Brandon, Co. Kerry; or Maamturk (Maumeen), Galway.
5. Bulbein Mount (Inishowen).
6. Ben Evenagh, Derry; or Reeks (Lough Googh), Co. Kerry.
7. Nephin or Croaghpatrick, Co. Mayo.

The remainder—Antrim Glens, Wicklow, and Mourne Mountains—never show such pleasing groups of alpine plants as these do. I have not been careful to make out the totals. I speak rather from the memory of the general facies of the flora in these places, several of which disclosed their botanical secrets for the first time to the present writer.

I will now notice a few omissions, &c., which are not dependent on information unavailable for the purposes of the *Cybele*. Those additional to Donegal are numbered. The references are to papers enumerated in *Cybele* (*Introduction : Index to authors*)—

1. **Ranunculus heterophyllus**, Fries.—In several of my Donegal papers, but I confess my nomenclature (authority for name) has been confusing. A frequent species in Donegal.
2. **R. Lingua**, L.—A Derry locality is given in my "Plants of some of the Mountain Ranges," &c. In deference to Mackay's record of so unmistakable a plant, I have let it stand for XI. in my *Flora*.
3. **Thalictrum flexuosum**, Bernh. (*T. collinum*, Wallr.)—Brown Hall, Co. Donegal. Determined by Mr. More (1886).
Papaver Argemone, L.—Howth and Baldoyle (*Flora of Howth*), V.
Nasturtium palustre, DC.—Liffey, at Island Bridge Weir, about 1870, V.
Sisymbrium Thallanum, J. Gay.—Lambay (*Flora of Lambay*), V.
4. **Hellanthemum vulgare**, L.—Should be included. Anyone who sees it *in situ* would consider it native in Donegal.
Viola hirta, L.—Lambay Island (*Flora of Lambay*), V.
Arenaria trinervia, L.—Powerscourt, and between Powerscourt front gate and Enniskerry, by the roadside (MS. lent to Mr. Colgan; referred to hereafter as MS.), IV.; Glencullen (MS.), V.
5. **Saxifraga hypnoides**, L.—I believe native in Fanet, Donegal. The rock is basaltic and the form (*gemmipara*, Syme), I think is the same as that of Ben Evenagh in Derry.
Anthemis nobilis, L.—To 1,200 feet, Kerry; 1,500? Wicklow; 900 Donegal (*On Range of Plants, etc.*).
Artemisia vulgaris, L.—Abundant in many parts of Donegal. "Nowhere common," *Cybele*. How far "introduced" it is impossible to speculate. A pestilential weed in cultivated land though never appearing in gardens.
6. **Taraxacum Dens-leonis**, Desf., var. **palustre**, DC.—Frequent in Donegal. (*Flora of N.W. Donegal, &c.*)
Andromeda Polifolia, L.—Bog close to Lough Derg on the west side with *Malaxis paludosa*, VI. (MS. furnished to Mr. Colgan).
Lysimachia vulgaris, L.—Very scarce in Donegal, and localities required.
7. **Anchusa sempervirens**, L.—District XII. has scarcely more claims to this plant than XI. It is naturalized in both.
Mertensia maritima, S. F. Gray.—No reason to consider it as decreasing in Donegal.
Lithospermum arvense, L.—The Donegal record is unfortunately an error of name by a slip of the pen, and belongs to *L. officinale*. *L. arvense* has only appeared as a casual.

Bartsia viscosa, L.—The absence of an intermediate station from Kerry to Donegal is no sort of suggestion that it has been introduced in Donegal. It is only evidence that like many other rare plants it has disappeared from many stations. It occurs in Scotland. Other outliers of a similar character are *Carum verticillatum*, *Euphorbia hiberna*, and *Trichomanes radicans*.

Melampyrum sylvaticum, L.—The late Mr. A. G. More counselled me against my inclination to reject this record from Donegal. I believe no specimens were forthcoming, and he believed there was an error. I have repeatedly searched the place indicated in *Cybele*.

Orobanche minor, Sm.—On *Ononis* and *Lotus* at Portmarnock, V. (*Journ. of Bot.*, 1897). The specimens are in the Dublin National Museum. They have been examined by Mr. Bennett, who has made a study of the genus. He says he can refer them to nothing but *O. minor*. The station is on unbroken ground, two or three hundred yards south of the Club-house. Having seen my record, the editors need scarcely have been at the trouble, gratuitously, of remarking "exclusively on *T. pratense* in Ireland."

Nepeta Glechoma, Benth.—Singularly rare in Donegal.

Atriplex portulacoides, L.—Muddy estuary close to the old ruined mill at Portmarnock, V.

A. farinosa, L.—See *Journal of Botany*, 1897, p. 346. This record is omitted in *Cybele*. The species appears to be spasmodic in its appearance in Dublin Bay. When I gathered it in 1897, my nephew was with me on each occasion, who has a good eye for plants. He was unable to rediscover it in 1898; it was however somewhat late in the season when he searched. I have no doubt of the species. In 1899 it reappeared (in no such plenty) in several of the habitats given in *Journal of Botany*.

Euphorbia hiberna, L.—The name *Makkin bwee* is the Irish in use in Galway for the Irish Spurge, as I recorded in *Journ. of Bot.* in 1873. It is the older name, given by Threlkeld and K'Eogh, who copied Threlkeld whenever he could, and when he could not, he let his imagination play freely around, at any rate in records, which should never be quoted unconfirmed. The Irish name given in *Cybele* is both wrongly spelt and interpreted. It is given in O'Reilly "*buidhe-na-ningean*, spurge; *tethymallus*," which would pronounce "bwee-na-ngeown," and translate "the yellow wave-lover." According to Cameron this name refers properly to *E. Paralias*, but the derivation would limit the name to *E. portlandica*, but as we see from O'Reilly it is generic. Cameron (*Gaelic Plant-names*) blunders about the trout poisoning. I never heard in Kerry of any plant used for the purpose except the Irish Spurge. At any rate *Makkin bwee* seems to be correctly the distinctive name. I believe the name of the hills above Chevy Chase, where I found this plant, was "Derrybrian." I did not learn the name till afterwards. It certainly was not "Derryea," as given in

Cybele. The name would be on old maps probably. It is not on any maps I have. The plant extends up the stream from the shooting-box of the Persse family (of Roxboro'), known as Chevy Chase, into these hills.

8. E. amygdaloides, L.—At Glenalla, Co. Donegal. The twenty years may now be called forty. It should not be excluded from XI. It is extremely unlikely it was intentionally introduced, or introduced at all.

E. Paralias, L.—Only one locality, very sparingly, in Donegal. *E. portlandica* is much more western in Donegal, occurring frequently right round from Malin Head to Bundoran. It will surely be found in Sligo, or somewhere between Bundoran and the Aran Islands. The distribution of these two plants is very odd, and might be paralleled by that of the two *Statices* on the Irish coasts.

E. exigua, L.—Apparently absent from the West of Ireland. Only occurs in the eastern half of Donegal, and is very rare.

Parietaria officinalis, L.—Very rare in or absent from the north-west. Not seen west of Derry by me in Donegal.

Salix phyllcifolia, L.—None of the north-east records have been verified for many years. The same remark applies to *S. nigricans*. It is impossible to help feeling sceptical, or at any rate disappointed. I believe the recorded localities have been carefully searched. I spent more than one day in the Roe above Dungiven. I have also doubts about "Urris Mountains, Donegal, C. Moore." It is so vague as to be useless, covering many miles of country (in Inishowen), but none that is likely to harbour *Salix nigricans*, and I have been botanizing over that country for over twenty years. The only evidence I have of this plant in Donegal is from a supposed *nigricans* × *caprea* from Ardara, (teste Mr. Bennett).

S. Moorei, H. C. Watson, (*S. herbacea* × *nigricans* ?)—This must be extremely rare on the top of Muckish, which is a plateau that occupies perhaps a square mile. It is such an inviting place to imagine finds of alpine *Junci*, or *Rubus Chamemorus*, as well as this willow, that I have frequently gone over it extensively on my knees, without success.

Empetrum nigrum, L.—"Rare at low levels" (!) *Cybele*.—It descends to sea-level all round Donegal; in Achill, Mayo, and elsewhere in the west. In the east strictly a mountain plant.

Juniperus nana, Willd.—Near Lake Nalacken, Brandon, Kerry, at about 1,650 feet (*Plants of some Mountain Ranges, etc.*, 1884).

Epipactis latifolia, L.—Very rare in Dublin. Howth, 1897 (*Journal of Bot.*) Specimens in Nat. Museum, Dublin. Roadside between Galway and Oughterard, 1883. (MS. to Mr. Colgan), VIII.

Ophrys apifera, L.—See *Flora of Howth*. Well known on Howth, and appears fairly regular in one or two places. Very rare in Dublin, V.

Arum maculatum, L.—Very local in Donegal, and apparently confined to the S.W. Distinctly a limestone plant in the West of Ireland. It appears to occur in Aran only of the Atlantic islands off Ireland.

Eriophorum latifolium, Hoppe.—The Co. Wicklow record might be obliterated, as the plant has been for half a century or so.

Carex stricta, Good.—Very rare in Donegal, and appears to me rare in most parts of Ireland away from the larger river-swamps or lake-margins, where only it attains its full tussocky perfection.

Carex riparia, Curtis.—Powerscourt, Co. Wicklow, near the game-keeper's lodge, IV.

9. **Agrostis vulgaris**, L., var. **pumila**, Lightf.—Occurs apparently in all the mountain districts, except Ben Bulbin and Sperrins. Ranges to 1,850 Galtees, and 1,550 in Donegal. (See *On Ranges of Flowering Plants, etc.*)

Phleum arenarium, L.—Portrane and North Bull (MS.)

Festuca sylvatica, Vill.—By the river between Rathdrum and Glendalough, IV. (MS.)

Trichomanes radicans, Swartz.—The Donegal record, "Hart, 1885, γ," is misleading. The Killarney Fern was found by me in 1884, about a fortnight later than Mr. Mahony's discovery, the knowledge of which led me to the special search that was successful, as duly recorded in 1885, γ. The "first record" should stand "(Pierce Mahony); Hart (*Journ. of Bot.*, 1884, p. 213)," for I had the pleasure of sending the notice of it. That is to say, the first printed record, perhaps there was an epistolary one earlier. In my *Flora of Donegal*, "1885" is an error for "1884."

Selaginella selaginoides, Gray.—Add Donegal to "sandhills by the sea."

The Appendix has been happily made use of liberally. Such receptacles for matters of opinion must always be open to disputes. Some of the data in this Appendix hurt our feelings, but generally it is a great improvement to the body of the *Cybele*. It would be a good rule to relegate to the Appendix *all* unconfirmed records of Wade, Smith, and especially K'Eogh. This has been largely done, but not completely, and I have not been at the pains to collect such omitted items. I may mention *Carex strigosa*, "Wade Rar.," Dargle, Co. Dublin, and *Euphorbia hiberna*, Anakirk (? Rine-kirk, searched by Mr. Stewart), Co. Limerick, K'Eogh.

K'Eogh has a formula, "it grows wild in the mountains of Burrin" (Clare), which he applies to *Satureia*, "Hedge hyssop," *Gratiola*; and a study of his localities reveals great unreliability.

10. *Helianthemum vulgare*, L.—Co. Donegal.—The simple assertion that “the species was either planted or derived from cultivation,” however courteous to my expressed opinion, does not satisfy me as an argument. It is merely so many words. Unless the editors have seen the station, they are unable to form an opinion of any value. I will be happy to guide either of them to the locality, which they are very unlikely (so remote is it) to find without assistance. It is a most interesting country, of many miles in extent, absolutely barren and devoid of possibility of cultivation, of the same formation as the well-known South Isles of Aran, craggy, but not so deeply fissured, and if anything less fertile. I have never visited this district (and it takes a week to thrash it) without great expectation, and I fully expect it will yet yield more rarities. There is no cultivation of any sort near the *Helianthemum*, nor a garden within some miles. Nor is the plant one which shows any disposition to ramble, even in a garden.

* ***Reseda suffruticulosa*, L.**—The claims of this plant to a place in the flora, from the Portmarnock habitat, are too strong to be overlooked. It has been naturalised there abundantly for at least 70 years. It should be left in with asterisk.

* ***Medicago sativa*, L.**—Admittedly and abundantly established in various places about Baldoyle, Portmarnock, Howth, and Portrane. Its claims are better than many admitted plants.

***Trifolium maritimum*, Huds.**—“The district V. records are all probably referable to *T. scabrum*” This is incorrect. The Lambay record is undoubtedly referable to *T. striatum*, where *T. scabrum* has not been found, and the former is plentiful. This is probably the case also with Kilbarrack record.

***Ribes Grossularia*, L.**—Is thoroughly established in wild places in Donegal. Sometimes borne thither by streams in flood, but sometimes apparently by birds.

***Anthemis arvensis*, L.**—Has as good a claim (from Howth, Portmarnock, &c.), to a place in flora as various other cereal weeds.

***Centaurea solstitialis*, L.**—I have gathered this twice at Portmarnock, about 1870-75.

***Myosotis sylvatica*, Hoffm.**—A white variety of this used to grow at Woodlands, among trees near the lake. No doubt an escape, but in a wild place.

11. *Atropa Belladonna*, L.—Should be kept in flora with a star.

***Mentha viridis*, L.**—I cannot follow the reasoning. When a plant is thoroughly established, in a wild place, unaided by cultivation, and where it has not been planted, does it come within a “starry influence”? Otherwise a number of other plants should be where these last two are. I should prefer the latter course myself.

Pinus sylvestris, L.—The people who “have any Irish” in Fanet, Co. Donegal, know the Scotch fir as “Gyoos” (*Guimhas*); and the silver is “*Gyoos ban*.” That from the bog is called *Gyoos dhu*. Joyce gives several names derived from *Guimhas* (2nd Ed., vol. ii., p. 358), and more could easily be added. But he says it is a question whether the place is named from the living tree or from bog-deal. The statement, however, that “the absence both from the spoken language and from the place-names of Ireland of any native name for the tree would tend to prove that it had become quite rare if not extinct in very early times” is unwarranted. O'Reilly gives the above word and also *pin-cram*, no doubt modern.

The *Cybele* credits Donegal with 722 species and sub-species. To these I add 12 as above, making 734. This may be taken as the number down to 1894, since when, though I have made many explorations and discoveries, I have published nothing but a few short notes, accounted for in the *Cybele*. Since that time also I have had useful help from Mr. Hunter (the rediscoverer of the Irish Spurge in Donegal), in Inishowen. *Hieracia* are already dealt with. They are not included in this total, except the forms (22 in number) selected for enumeration in the *Cybele*. Of that number Donegal is credited with 10 (!) forms. My recent researches add 7 more of the said *Cybele* list, bringing the flora total up to 741. The manner in which, however, the *Hieracia* are enumerated, varieties being raised to sub-species, or even to species at pleasure, renders numerical computation almost hopeless in this genus. I would, however, add some well-marked forms to the total from my foregoing list, which are not recorded hitherto from Ireland, viz.: *H. sparsifolium*, *H. proximum*, *H. (saxifragum) orimeles*, making the total 744. Brambles are to be counted as only one all round, which is a relief. I will, however, enumerate the *Rubus* forms I have had named from Donegal. The full localities for the following list will be found in my *Flora of Donegal*. I will also enumerate (unnumbered) the names of rare Donegal plants for which I have found new localities, also to be found in the *Flora*, or else in a paper on Inishowen and Fanet excursions during the season of 1898.¹ So that the following remarks refer mainly to information relative to Donegal plants which was unavailable to the editors of the *Cybele*. 2nd Edition. Plants numbered are additions to

¹ *Journ. Bot.*, xxxvii., 1899,

the Donegal flora as enumerated in *Cybele*. Those unnumbered are rare species or sub-species for which new localities have been found.

1. **Thalictrum dunense**, Dum.

Ranunculus bulbosus, L.—“Rare in the north-west,” *Cybele*.

Frequent all round the sandy coast of Donegal, and abundant in most suitable places.

2. **R. auricomus**, L.—Most rare in the north-west (Donegal). A single locality in the eastern half of the county.

Glaucium flavum, Crantz.—Has no place in the Donegal flora.

3. **Viola odorata**, L.—Thoroughly established in several places.

4. **V. (sylvatica) Reichenbachiana**, Boreau.—Carrablagh, &c., 1898.

5. **V. tricolor**, L.—Fanet, 1898.

To these two I had not accorded segregative distribution.

6. **Arabis ciliata**, R. Br.—Rosses, Co. Donegal. “The best *ciliata* I have seen”—A. Bennett.

Arenaria trinervia, L.—Abundant by the River Erne.

Ulex Gallii, Planch.—Inishowen, 1898. (Mr. Hunter).

7. **Ononis repens**, L.—Omit brackets in *Cybele* to XI. Two new localities discovered.

Rubus.—The forms noticed in Donegal additional to those given in *Cybele*, are *R. plicatus*, Wh. and N., and var. *hemistemon*; *R. carpinifolius*, Wh. and N., and *R. incurvatus* var.; *R. rhamnifolius*, Wh. and N.; *R. pyramidalis*, Kalt.; *R. leucostachys*, Schleich, and *R. villicaulis*; *R. rosaceus*, var. *hystrix*; *R. Koehleri*, Wh. and N.; and *R. corylifolius*, Smith. These have been determined by competent authorities (see *Flora of Donegal*).

Radiola Millegrana, L.—Profusely abundant at Malin Head, the extreme north of Ireland.

8. **Rosa mollis**, Smith.

Dryas octopetala, L.—Less scarce than I supposed in its single locality.

Epilobium angustifolium, L.—Sea-level to 1,100 feet, Donegal.

Apium inundatum, Reichb. fil., var. **Moorei**, Syme.

A. nodiflorum, L., var. **ocreatum**, Bab.

A. nodiflorum, L., var. **repens**, Hook. fil.

Pimpinella Saxifraga, L.—Frequent in the S.W. of Donegal, on limestone.

9. **Arctium minus**, Bernh.—Clonmany, Inishowen (1898), and probably frequent.

Carduus crispus, L.—Near Malin town, Culdaff, &c., in Inishowen, frequent.

10. **Statice bahusiensis**, Fries, var. **borealis**, Fr.—Determined by Mr. Bennett. North shores of Mulroy, Co. Donegal. This form is not mentioned in *Cybele*.

S. occidentalis, Lloyd (*binervosa*, P. L. Smith), var. **intermedia**, Syme.

11. *Myosotis collina*, Hoffm.—New locality, and for var. *umbrosa*, Bisch. (*vide* A. Bennett).
12. *Utricularia neglecta*, Lehm.—S.W. Donegal.
Ulmus montana, L.—New native locality.
13. *Potamogeton nvarians*, Monig. (= *heterophyllus* × *Zizii* ?).—See *Flora*.
P. rufescens, Schrad.—Not unfrequent in Donegal.
P. nitens, Weber, var. *intermedius*, Tisselius.—“Closely approximating to”—A. Bennett.
P. lucens, L., var. *lancifolius*, Mertens and Koch.
14. *P. flabellatus*, Bab.
P. decipiens, *P. Zizii*, *P. prælongus*, and *P. obtusifolius*; new localities for these in Donegal.
P. pusillus, L., var. *tenuissimus*, Koch.—Doagh Island, Inishowen, Co. Donegal, 1898. Not in *Cybele*.
Zostera marina, L., var. *angustifolia*, Fr.—Inishowen. Not in *Cybele*.
Z. nana, Roth.—New locality in Inishowen, 1898.
15. *Eleocharis acicularis*, R. Br.—S.W. Donegal.
16. *E. uniglumis*, Link.—S.W. Donegal.
Carex teretiuscula, Good., var. *Ehrhartiana*, Hoppe.—Three Donegal localities westwards. Not in *Cybele*.
17. *C. acuta*, L.—S.W. Donegal. *C. acuta* var. *prolixa*, S.W. Donegal; Not in *Cybele*.
C. aquatilis, Wahlb. (type) with var. *virescens* at Doochary Bridge, Donegal, so this county has all three forms. An instance of a Highland type plant (in three forms) at sea-level.
C. vulgaris, Fr., var. *juncella*, Fr. — Several localities in Donegal.
C. limosa, *C. pallescens*, *C. filiformis*, all frequent west of Lough Swilly.
C. riparia, Curtis.—A remarkable form at St. John's Point, S.W. Donegal, “closely approaching the American var. *Watsoni* Olney”—A. Bennett.
C. ampullacea, Good., var. *elatior*, Blyth.—Two localities. Not in *Cybele*.
18. *Poa nemoralis*, L.—Inishowen, 1898. Discovered by Mr. Hunter.
19. *Trisetum flavescens*, Beauv.—Expectation correct. Found it about Bundoran.
20. *Bromus erectus*, Huds.—I see no reason why *Cybele* should exclude from XI. “railway banks, Gt. Northern,” and include III., “railway banks, Portarlinton”!
21. *B. secalinus*, L.—Apparently established off cultivation by Lennan River, Donegal.
B. commutatus, Schrad. — Several more good localities in Donegal.
Asplenium viride, Huds.—I fear the Loughsalt locality is an error. It dates back to 1868, and I have never refound it there.

Cystopteris fragilis, Bernh.—Throughout Donegal, except south-east and not unfrequent in mountains westwards. Var. *dentata*, in at least three localities in Co. Donegal.

Lastræa Thelypteris, L.—New locality, S.W. Donegal.

22. **Ophloglossum polyphyllum**, Syme?

23. **Equisetum trachyodon**, Braun.—Two localities, S.W. Donegal.

Lycopodium clavatum, L.—Not unfrequent in Donegal. To 1,950 feet.

L. alpinum, L.—Half a dozen localities.

Isoetes lacustris, var. *falcata*, Tausch —Near Ballyshannon. (*vide* A. Bennett).

24. **Chara contraria**, Kuetz.—Fanet and Ardara.

25. **C. hispida**, L.—Fanet, 1898.

C. fragilis, Desv., var. *delicatula*.—Frequent in Donegal.

The above 25 additions bring the Donegal total to $744 + 25 = 769$. But from this we have to deduct *Glaucium flavum*, *Lepidium Smithii*, *Hieracium boreale*, *Sium latifolium* (?) *Lithospermum arvense*, and *Melampyrum sylvaticum*, all of which are counted in the *Cybele* total of 722. The reasons for excluding these are given. This leaves a residue of 763.

In conclusion I wish to say that it is nowise my desire to find fault with this most careful and creditable production. But I think it will be of use to have pointed out some of those errors that were certain to occur, and I am bound to uphold the character of the flora of my native county.

I would like here to suggest an improvement to a "botanical subdivision" of the county suggested by Mr. R. Lloyd Praeger.¹ He divides the county in two, drawing a line along the Kilmacrenan barony to the Gweedore River and adding that northern portion to Inishowen. Any such line crossing the west of the county is at variance with its botany, which is harmonious from Sheephaven to Donegal Bay. The only division practicable would be Inishowen and Raphoe baronies (my I., II., and V.) on the east, which are fairly distinct botanically from the rest of the county. Fanet and the rest of District III., are intermediate but more western. Tirhugh in the south should be added to the Fermanagh district, scientifically, but it would be a mistake to remove it from Donegal. The county is better left as one subdivision as it stands. The Foyle and Malin Head are great boundaries phytogeographically as well as biologically generally.

Carrablagh, Co. Donegal.

¹ On the Botanical Subdivision of Ireland, *Irish Naturalist*, Feb. 1896.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of Giskins from Mr. W. D. Beatty. An Antelope has been born in the Gardens. We regret to learn that the deaths of the fine male Chimpanzee, which has been in the Gardens for four years, and of the Silver Gibbon, leave the collections for the present without any of the man-like Apes.

3,273 persons visited the Gardens during December.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 19.—Mr. WILLIAM SWANSTON, F.G.S., in the chair.

A lecture was delivered by Mr. A. SPEERS, B.Sc., on cavern formations, with special reference to the mammoth cave of Kentucky. For half an hour before the lecture there was an exhibition and discussion of land and fresh-water shells, of which a large number were exhibited by Messrs. H. L. Orr, R. Welch, W. Swanston, W. Gray, and R. Standen, of Manchester. Mr. R. Welch read a short paper on the rare forms of *Helix nemoralis*, found at Bundoran, where the normal form is made into necklaces, and sold to visitors. Necklaces of this kind are survivals of the pre-historic forms found in ancient Irish graves. Scalariform and reversed specimens occur at Bundoran, as well as a curious heavy form of var. *hyalozonata*, all being of great interest to naturalists, and furnishing a topic for an animated discussion. Mr. R. Standen, of Manchester Field Club, sent for exhibition a series of English and Irish amber shells (*Succinea*), and Mr. Orr exhibited a curious malformation of the shell *Clausilia bidentata*, which had two mouths, and the members present exhibited over one hundred specimens of reversed and scalariform shells of *Helix nemoralis*.

Mr. Speers, proceeding with his lecture, very fully described the various forms of caves, and demonstrated by a successful chemical experiment the solubility of limestone in water charged with carbon dioxide. The extensive deposits of limestone in Ireland and elsewhere are acted upon in this manner. Mr. Speers described the great Mammoth cave of Kentucky, which he had visited, and which is found to consist of a series of chambers on five different levels, connected by miles of avenues through which the visitor is taken by the guides. In closing his address Mr. Speers referred to the anthropological value of caverns, which in pre-historic times were the resort of early mankind, and referred in detail to some special examples.

Mr. Welch and Mr. Hogg exhibited some very excellent lantern views of caverns in many parts of central Ireland, and view of egg-cluster of the Kerry slug (*Geomalacus*) for the first time on any screen, and Mr. Gray exhibited and described views of caverns that occur in the several geological formations of the County Antrim, mainly, however, such as were formed by marine denudation.

BOTANICAL SECTION.—DECEMBER 16.—An instructive lecture was given by Rev. CANON H. W. LETT, on "Sedges," which was fully illustrated by specimens from his own collection. He drew particular attention to the species most likely to be confounded, and showed the distinguishing marks. Some species might still be overlooked in the district for this reason, such as *Carex pauciflora*, which he found in one locality in Co. Antrim a few years ago, and which Mr. Adams has lately gathered in another place nearer Carnlough.

CORK NATURALISTS' FIELD CLUB.

DECEMBER 6.—Mrs. BROOKE-HUGHES delivered a lecture entitled "Some By-paths of Science." Mr. T. Farrington, M.A., presided, and there were many present. The Chairman, in introducing Mrs. Hughes, wished to inform them that in a competition for the preparation of botanical specimens by the proprietors of *Cassell's Magazine*, there had been seven prizes won by Cork people, which was a larger number than any other city of the United Kingdom outside London could boast. Mrs. Brook-Hughes then proceeded with her theme, which was both entertaining and instructive. She related trips to several parts of the South and West of Ireland, and recounted the different floral and geological features of the several places. She also referred to some of the peculiarities by which the instinct of birds and insects was made manifest. The lecture was illustrated by Mr. J. Bradshaw. The proceedings closed with a warm vote of thanks to Mrs. Hughes.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 21.—The Club met at Leinster House. Mr. F. W. MOORE showed leaves from the ovary of *Arachnanthe Lowii*, a remarkable Orchid from Borneo, which recently flowered in the collection at Glasnevin. There were six racemes, varying in length from six feet to eight feet two inches, and the ovaries of all the flowers were covered with a dense, brown, moss-like pubescence. The hairs composing this pubescence were large, compound, much branched, composed of many cells, and closely crowded together.

Professor SCOTT showed crystals of egg-albumen prepared by Hopkins's modification of Hofmeister's method. The crystals appeared as fan-shaped bundles of acicular crystals or spheres, composed of a great number of such.

Mr. M'ARDLE exhibited the mother-spores of *Lejeunea Rossettiana*, which were found in the lower part of the capsule, where they occur in circular discs. The young spores present two forms, oblong-cuneate and oblong-elongated; about twelve occupy the outer part of the circle, with four in the centre, all enclosed in undulating delicate tissue, called the *archisporium*, which also envelopes the young spores, which are of a bright green colour, with delicate granular markings on the exosporium.

Mr. H. J. SEYMOUR showed several gold nuggets, the largest nearly one-eighth of an inch in diameter, obtained by Mr. M'Henry, of the Geological Survey, some twelve years ago, from Mr. Acheson's washings in the Gold Mine River, Co. Wicklow.

NOTES.

ZOOLOGY.

INSECTS.

Abundance of *Colias edusa* in Connemara.

In the January number of the *Entom. Mo. Mag.* (vol. xxvi., p. 1), the Rev. C. T. Crutwell, of Kilworth, Leicestershire, records the occurrence of hundreds of males of this butterfly at Renvyle during the past summer.

***Zelleria phillyrella*, Milliere, introduced in Connemara.**

On pp. 4-6 of the same number of the *Ent. Mo. Mag.*, Mr. C. G. Barrett records the capture by Mr. Crutwell of a single specimen of this South European insect at Renvyle. He states, on the authority of Mr. W. F. de V. Kane, that several species of its food-plant—*Phillyrea*—are cultivated in gardens in the West of Ireland, and expresses his opinion that the moth has been then introduced into our country.

Late Wasps' Nests.

On December 8th, I saw three wasps' nests all working, in the vicinity of Fassaroe, Co. Wicklow. On December 15th one of these had apparently ceased, but the other two were still lively. Last year (1898) I saw a wasps' nest in the same neighbourhood hard at work on December 23rd; and I learned from Mr. Barrington that this nest continued active until the beginning of the new year. Mr. Barrington also told me that in a former year he had observed one so late as January 10th. At Ballyhyland I have never seen, and only once heard of, a wasps' nest working in December; but this would seem to be of normal occurrence in parts of Co. Wicklow. The nests referred to above were, I believe, all inhabited by *Vespa vulgaris*.

C. B. MOFFAT.

Ballyhyland, Co. Wexford.

MOLLUSCS.

***Arion ater*, var. *Bocagei*, in Ireland.**

Some years ago Prof. Simroth described a new variety of the common slug, *Arion ater*, from Portugal, which, instead of being uniform in colour, was yellow above, with brown sides. He named it variety *Bocagei*, after the Portuguese naturalist, Bocage. Mr. Collinge now records (*Journ. Malacol.*, 1899, vol. 7 p. 33), the same variety from the South of Ireland, and expresses the view that it belongs to the same category as *Geomalacus maculosus*, as far as distribution is concerned. Mr. Collinge, it will be noticed, uses the name *Arion empiricorum* of Ferussac instead of the earlier *A. ater*, as he believes these to be two distinct species. Prof. Simroth and I do not agree with him, and it certainly seems to me that *Arion ater*, being the older name, has the priority, and should therefore be used.

R. F. SCHARFF.

Science and Art Museum, Dublin.

Vertigo antivertigo in Ireland.

The current number of the *Journal of Conchology* contains a note by Mr. Welch recording the occurrence of a large colony of this little shell in rushy ground, near Shaw's Bridge, Belfast. Mr. Welch obtained 400 specimens with very little difficulty, by cutting off bunches of stems of the rushes that abounded, and shaking them over a newspaper.

Amphipectea glutinosa, Muller, in Ireland.

In 1871 the late Charles Ashford, a well-known English conchologist, recorded in *Science Gossip* the finding of this very rare freshwater shell in the River Brosna, King's Co., and in the *Journ. of Conchology* for 1879 its occurrence in the Newry Canal, Co. Down, where only two specimens were obtained, though it was plentiful in the first locality named. Since then Dr. Scharff informs me that Mr. Farran obtained one dead specimen on the shores of Lake Deravaragh, Co. Westmeath, and on looking over some shells Mr. W. F. de V. Kane collected lately in Lough Arrow, on the borders of the Counties Sligo and Roscommon, I find a half grown specimen.

To these records I am now able to add another. Mr. Wm. Green, of Belfast, who has lately taken up the study of mollusca, discovered three specimens in two drains on the edge of the Bann River, North of Portadown, Co. Armagh, on December 25th last. They were living among dead Duckweed and plant debris on the surface of the water. Some of the shells were almost full-grown, and were kept alive for some days in order to examine the way in which the expansion of the mantle covers the shell. Jeffreys, Adams, and other writers state that though very local it is sometimes abundant. Though not quite such a local species as *Limnæa involuta*, *Amphipectea glutinosa* must be considered as one of our rarest freshwater shells, and both Mr. Green and Mr. Kane are to be congratulated in adding a new locality to those already known.

Belfast.

R. WELCH.

FISHES,

Blue Sharks in Killala Bay.

One day towards the end of October as Captain Kirkwood was walking along the sands at the western end of Bartragh, he found a large Blue Shark (*Selache maxima*) thrown up by the surf at high water mark; the fish was dead, but quite fresh, and was one of the largest I have heard of on the Irish coast, measuring between nine and ten feet in length. Another specimen of this species of shark was taken in the estuary (about the 22nd November) by two persons who were out shooting wild fowl; as they were passing between the islands they heard a splashing some distance astern, and rowing to the place from where the noise proceeded, they found the fish floundering about in the shallow water where it was aground. Having shot it, they took it into their boat with some difficulty, as it was about eight feet in length, and very heavy.

ROBERT WARREN.

Moyview, Ballina.

BIRDS.

Irish Ornithology.

The *Zoologist* for November contains an article by Mr. H. E. Howard, entitled "Ornithological Notes from the North-west of Ireland," describing the bird-life as noted by the author in August, presumably on the coast of Donegal. The paper closes with a commendable protest against the unsportsmanlike slaughter of sea-birds by so-called "sportsmen."

Golden Plover and Lapwings in the Moy Estuary.

The Golden Plover did not visit the sands in any numbers until the middle, and towards the end of October, after which time they began to increase up to the 24th, when I saw fully 2,000 birds in one large stand on the Scurmore sands, and since then they continued to haunt the banks in probably larger numbers, for they now (2nd Dec.) have divided into two stands, one haunting the margin, and the other the Scurmore sands.

The Lapwings appeared about the banks in their average numbers up to the 20th of November, when they visited the sands in immense flocks more numerous than in any year since 1878 (the "Great Lapwing Year.")

On the morning of the 20th, at daybreak, Mr. A. C. Kirkwood, at Bartragh, saw an immense flock at a great height coming from a northerly direction over the bay. On reaching the island, they kept flying about for nearly an hour, and then settled down on the Bartragh sands opposite Moyne Abbey; at the same time that this large assembly of birds was resting near Moyne, equally large flocks were further up the estuary on the Scurmore and Castleconna sands, and a fourth large flock was resting on the banks outside the island. Most of these birds were evidently new arrivals distrusting their new quarters, and so restless and easily alarmed, that it was impossible to get within shot of any of the large stands. Mr. Kirkwood was out with his punt and gun all day, and was unable to get within range of any, but a few scattered birds. I was out all day on the 21st, and was equally unsuccessful. I never met Lapwing so wild, so utterly unlike their usual unsuspicious habits on the approach of a shooting punt. I was out again on the 22nd, and although the birds actually swarmed on the Moyne, Bartragh, Scurmore, and Castleconna sands, yet I was unable to obtain a shot at any but a few scattered birds.

It is impossible to account for this extreme wildness of the Lapwings; the fine weather cannot be the cause, for some of my best days' Plover shooting on the estuary were on mild, calm days, when owing to the mildness of the weather, the birds used to assemble on the sands at the edge of the channels to wash and bathe, and remain until driven off by the rising tide.

It would be interesting to know whether a similar influx of Golden Plover and Lapwings has taken place in other parts of the country.

ROBERT WARREN.

Moyview, Ballina.

Rough-legged Buzzard near Londonderry.

On 4th October last Mr. Wm. Kilpatrick shot a fine male specimen of the Rough-legged Buzzard (*Buteo lagopus*, Gmelin) at Campsie, about five miles from Londonderry.

This is the second occurrence of the species in Co. Derry, one having been taken at Castlerock early in November, 1891, and sent to me for identification.

D. C. CAMPBELL.

Londonderry.

MAMMALS.

The Hedgehog and its Food.

The *Irish Naturalist* for December, vol. viii., no. 12, contains an interesting note relating to the Hedgehog and its food, by Mr. H. L. Orr. Perhaps a few observations I made on these animals may be of interest to Mr. Orr. I twice found Hedgehogs curled up, and on opening, or rather uncurling them, I found they had slugs sticking to their paws. One slug had a large piece almost completely bitten through. I kept a Hedgehog last summer for some days, and fed him on slugs, and small and delicate-shelled snails. He seemed to prefer the slugs, but did not once refuse a snail when offered. Their teeth are very strong and sharp; when they bite a slug they usually take the piece out completely.

JOHN H. O'CONNELL.

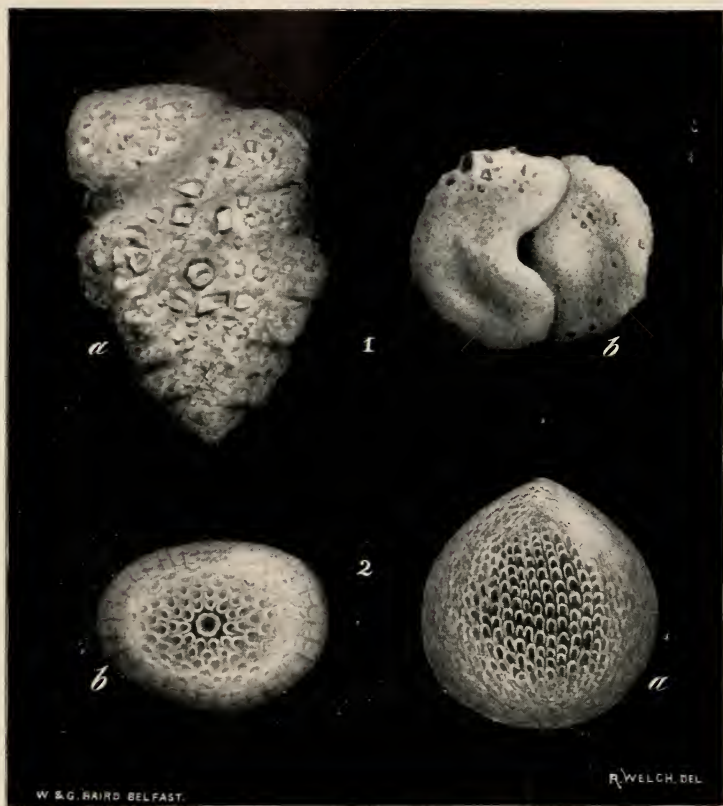
Dublin.

I venture to suggest, that the broken snail-shells to which Mr. Orr refers under this heading, in the December number (p. 268), are not the work of the Hedgehog but of the Rat, an animal whose runs are commonly full of such fragments. The Hedgehog's propensity for eating snails is so well known that it is often kept in gardens to destroy these unwelcome guests, and I have frequently watched it crunching them up, as Mr. Orr describes; but in my experience the Hedgehog crunches up a shell so completely, that very few fragments are likely to be found afterwards. Last June, having promised to supply a neighbour with a few Hedgehogs, I caught two late one evening, shut them up for the night, and gave them for supper twenty-four large snails (*Helix aspersa*), as well as some slugs (chiefly *Limax marginatus*)—with the result that great crunching was heard during the next half-hour, and on the following morning there was not a vestige of snail or snail-shell remaining. Unless, therefore, the shell of *Helix nemoralis* is exceptionally distasteful, I scarcely think many of its fragments would be left by the Hedgehog. I have also seen Hedgehogs, in the wild state, eating *Arion ater*—a slug which, I believe, most birds reject.

C. B. MOFFAT.

Ballyhyland.





FORAMINIFERA, from Dog's Bay, Connemara.

1. *Gaudryina rudis* nov. $\times 40$.
2. *Lagena squamosa* var. *Montagui*, Alcock $\times 75$.

To face p. 51.]

THE FORAMINIFERA OF DOG'S BAY, CONNEMARA.

BY JOSEPH WRIGHT, F.G.S.

(Plate 2.)

THE September number of the *Irish Naturalist* for 1895 was entirely devoted to an account of the excursion of the Field Club Union to Galway in July of the same year. Among the reports then published of the specimens collected during the excursion, was one by myself on the Foraminifera of Dog's Bay. This list was hastily prepared when a very small portion only of the shore-sand had been examined, and although it could not be looked on as complete, I thought it best that it should appear in the same number as the other reports. At the time I had hoped to have been able to examine the remaining material with little delay, but other engagements prevented my doing so until now.

The sand at Dog's Bay is almost entirely composed of small molluscan shells, with Foraminifera, Ostracoda, and other marine organisms; it is in consequence much lighter than ordinary sand. It extends for a long distance beyond high water mark, being blown inland by the prevailing westerly winds.

The following list of 124 species and varieties consists for the greater part of Foraminifera which are widely distributed around the British coasts. *Massilina secans* and *Truncatulina lobatula* are the prevailing forms, the former occurring in great abundance in the coarser floatings whilst the latter is even still more abundant in the finer ones.

The porcellaneous Foraminifera are well represented, many of the species occurring in considerable numbers. The hyaline forms are however by far the most abundant. The *Lagenæ* are very numerous and in great variety, twenty-two species having been obtained. *Polymorphinæ* are also plentiful, some of the species, as *P. communis*, *P. compressa*, and *P. lactea* often attaining large dimensions. The Arenacea are very rare, only three species having been found; of these one specimen was obtained of *Valvulina fusca*, two of *Haplophragmium globigeriniforme*, and twenty of *H. canariense*.

Lagena acuticosta, *Miliolina circularis*, and *Polystomella macella* are new to the British fauna, and *Gaudryina rudis* is new to science. The following species have been hitherto recorded in the British Isles only from the west coast of Ireland; they

have all been previously obtained in dredgings taken off Bantry Bay in 1885, during the first cruise of the s.s. "Lord Bandon," viz.:—*Spiroloculina tenuiseptata*, *Textularia concava*, *Bulimina Buchiana*, *Lagena fimbriata*, *Nodosaria* (Gl.) *rotundata*, *Globigerina rubra*, and *Gypsina globulus*.

Dr. Alcock, in his "Natural History of Connemara,"¹ enumerates sixty-one species and varieties of Foraminifera from this locality, all of which, with the exception of *Trochammina inflata* and *Nonionina umbilicatula*, have been obtained from the sand which I examined. He also found, at a subsequent period, a specimen of *Lagena crenata*, which was figured by Balkwill and Wright in "Foraminifera of Dublin Bay and Irish Sea."² This rare and lovely *Lagena* was found in a number of the Lord Bandon gatherings at depths varying from 44 to 214 fathoms, also at Hone Island between tides.

To my friend Mr. Robert Welch I am greatly indebted for the quantity of sand and floatings which he placed in my hands for examination, as also for the very accurate and artistic drawings which accompany this paper. I have likewise to express my thanks to Messrs. E. Collier and R. Standen, of Manchester, for kind assistance rendered also in collecting material.

LIST OF SPECIES.

Biloculina irregularis, d'Orb.—Common.

ringens (Lamk.)—Very rare.

var. **elongata**, d'Orb.—Rare.

depressa, d'Orb.—Common.

Spiroloculina planulata (Lamk.)—Common.

excavata, d'Orb.—Rare.

canaliculata, d'Orb.—Rare.

tenuiseptata, Br.—Rare.

Millolina trigonula (Lamk.)—One poor specimen.

tricarinata (d'Orb.)—Very rare.

insignis, Br.—Rare.

oblonga (Montg.)—Frequent.

seminulum (Linn.)—Common.

auberiana (d'Orb.)—Frequent.

contorta (d'Orb.)—Common.

subrotunda (Montg.)—Very common.

circularis (Bornem.)—Very common.

seminuda, Rss.—Very common.

Ferussacii (d'Orb.)—Rare.

bicornis (W. & J.)—Common.

¹ *Proc. Lit. & Phil. Soc., Manchester*, 1864-5, vol. iv., no. 15.

² *Trans. R.I.A.*, 1885, vol. xxviii., p. 339, pl. xiv., fig. 18.

Massillina secans (d'Orb.)—*Quinqueloculina secans* (d'Orb.) 1826, *Ann. Sci. Nat.*, vol. vii., p. 303, No. 43; Modèle, No. 96. *Massilina secans* (d'Orb.) Schlumberger, 1893, *Mém. Soc. Zool. de France*, vol. vi., p. 218, W.C. figs. 31-34 and pl. iv., figs. 82, 83.—Most abundant.

Cornuspira involvens (Rss.)—Very rare.

Haplophragmium canariense (d'Orb.)—Common.

globigeriniforme (P. & J.)—Very rare.

Valvulina fusca (Will.)—One poor specimen.

Textularia agglutinans, d'Orb.—One specimen.

gramen, d'Orb.—Very common.

concava, Kar.—Very common.

Spiroplecta sagittula (Def.)—Rare.

Gaudryina rudis, nov. sp. Pl. 2., figs. 1 a. b. Elongate, tapering, often more or less irregular in contour, round in transverse section, coarsely arenaceous.

This species, in consequence of its rough exterior, does not show the chambers distinctly, and for the same reason its dimorphous mode of growth is not very apparent. It is generally found with the apex of the test broken off, and when such is the case three chambers are exposed in cross section; the later chambers are arranged as in *Textularia*.

Widely distributed around the Irish coast, it occurred in thirty of the Lord Bandon gatherings, South-West of Ireland, from between tides, to a depth of 110 fms.; frequent off Belfast Lough, 30-60 fms. Common at Dog's Bay.

Bullmina pupoides, d'Orb.—Frequent.

pyrula, d'Orb.—Very rare.

fusiformis, Will.—One broken specimen.

marginata, d'Orb.—Common, specimens fine.

subteres, Brd.—Frequent.

buchiana, d'Orb.—One specimen.

Virgullina schreibersiana, Cz.—One broken specimen.

Bolivina punctata, d'Orb.—Rare.

pllicata, d'Orb.—Rare.

lævigata (Will.)—Rare.

difformis (Will.)—Rare.

dilatata, Rss.—Rare.

Cassidulina lævigata, d'Orb.—Very common.

crassa, d'Orb.—Very common.

Bradyi, Norman.—Rare.

Lagena globosa (Montg.)—Very common.

lævis (Montg.)—Rare.

var. **clavata** (d'Orb.)—Common.

var. **gracillima** (Seg.)—Very rare.

aspera, Rss.—One small specimen.

hispidula, Rss.—Rare.

acuticosta, Rss.—One specimen.

costata (Will.)—Common.

sulcata (W. & J.)—Rare.

var. **interrupta**, Will.—Very common.

var. **Lyellii**, Seg.—Rare.

Lagena Williamsoni (Alcock)—Very common.

striata (d'Orb.)—Rare.

lineata (Will.)—Frequent.

semistriata Will.,—Common.

semilineata Wright,—One specimen.

squamosa (Montg.)—Very common.

var. **Montagui** (Alcock). Pl. 2, fig. 2 a. b.

This variety occurs very fine and in considerable numbers at Dog's Bay. It differs from *L. squamosa* in being more globular, and frequently more or less compressed or irregular in contour; the raised surface reticulations are also very much smaller. I had given this variety a MS. name, but now find that it had already been named *Entosolenia Montagui* by Dr. Alcock in his "Natural History of Connemara," but it was not figured by him, and this is no doubt the reason that it came to be overlooked; he thus describes it, "a squamous form but differs from the named varieties of *E. squamosa* in having its surface really covered with a pattern like scales instead of with raised reticulations. Well-developed specimens are not at all flattened, though many are found as if crushed, and they then present an appearance resembling a dried fig; the true shape however is a perfect oval, full and well rounded at the smaller end, and from the middle of this projects a short smooth cylindrical tube. With a low power of the microscope, the whole surface of the body appears to be made up of small, almost square facets, arranged in distinct longitudinal rows; but when these are more highly magnified each flattened surface is seen to rise a little anteriorly, and to have the front border rounded so as to give exactly the appearance of a covering of scales." Generally distributed around the Irish coast, but much less common than *L. squamosa*.

Lagena hexagona (Will.)—Very common.

lævigata (Rss.)—Very rare.

lucida (Will.)—Common, trigonal forms very rare.

quadricostulata, Rss.—Very common, trigonal forms very rare.

marginata (W. & B.)—Frequent.

orbignyana (Seg.)—Very common, trigonal forms rare.

clathrata, Br.—Rare.

pulchella, Br.—Frequent, trigonal forms very rare.

filmbriata, Br.—Rare.

Nodosaria (Glandulina) rotundata, Rss.—Rare, surface marked with fine longitudinal lines.

pyrula, d'Orb.—Very rare.

communis, d'Orb.—Very rare.

scalaris (Batsch.)—Frequent.

Cristellaria rotulata (Lamk.)—Rare.

crepidula (F. & M.)—Frequent.

Polymorphina lactea (W. & J.)—Very common, a few large fistulose forms.

var. **amygdaloides**, P. B. & J.—Rare.

var. **oblonga**, Will.—Frequent.

- Polymorphina sororia**, Rss.—Rare.
lanceolata, Rss.—Very rare.
compressa, d'Orb.—Frequent, specimens fine.
communis, d'Orb.—Very common, specimens fine
rotundata (Bornem.)—Rare.
myristiformis, Will.—Frequent.
- Uvigerina angulosa**, Will.—Frequent.
- Globigerina bulloides**, d'Orb.—Very common.
rubra, d'Orb.—Very rare.
æquilateralis, Br.—One specimen.
Inflata, d'Orb.—Very common.
- Orbulina universa**, d'Orb.—Common.
- Spirillina viripara**, Ehr.—Rare.
margaritifera, Will.—One specimen.
- Patellina corrugata**, Will.—Rare.
- Discorbina globularis** (d'Orb.)—Very common.
rosacea (d'Orb.)—Very common.
nitida (Will.)—Common.
orbicula is (Terg.)—Rare.
parisien is (d'Orb.)—Very rare.
Wrighti Br.—Rare.
Bertheloti (d'Orb.)—Rare.
- Planorbulina mediterranensis**, d'Orb.—Common.
- Truncatulina refulgens** (Montf.)—Very rare.
lobatula (W. & J.)—Most abundant.
variabilis, d'Orb.—Very common.
ungeriana (d'Orb.)—One specimen.
- Pulvinulina repanda** (F. & M.)—Very rare.
auricula (F. & M.)—Very common.
patagonica (d'Orb.)—Rare.
- Rotalia Beccarii** (Linn.)—Rare.
orbicularis, d'Orb.—One specimen.
- Gypsina vesicularis** (P. & J.)—Rare.
globulus (Rss.)—One fine specimen.
Inhærens (Sch.)—Common.
- Nonionina depressula** (W. & J.)—Very common.
pauperata, B. & W.—Very rare.
turgida (Will.)—Very rare.
stelligera, d'Orb.—Rare.
- Polystomella crispa** (Linn.)—Frequent.
macella (F. & M.)—Frequent.
striato-punctata (F. & M.)—Common.
- Operculina ammonoides** (Gron.)—Very rare.

EXPLANATION OF PLATE 2.

1. *Gaudryina rudis*, *sp. nov.*—(a) lateral aspect; (b) oral aspect. × 40.
2. *Lagena squamosa*, var. *Montagui*, Alcock—(a) lateral aspect; (b) oral aspect. × 75.

REMARKS ON THE SECOND EDITION OF *CYBELE HIBERNICA*: A REJOINDER.

BY NATHANIEL COLGAN, M.R.I.A., AND REGINALD W. SCULLY, F.L.S.

THERE can be no more wholesome discipline for a writer than to have his work submitted to a searching and outspoken criticism, such as Mr. Hart has pronounced on the new *Cybele Hibernica* in last month's issue of this Journal. When we first glanced over his *Remarks*, and saw our editorial sins and peccadillos registered with all that conscientious minuteness which usually characterizes one's inventories of his neighbour's shortcomings, we began to fear that the case against us might prove a rather damaging one. But to a closer scrutiny it revealed many weak points. We found in not a few instances that our critic had charged us with doing what we had left undone, and with leaving undone what we had done; in short, that the negligence imputed to us was often more fitly attributable to himself.

Mr. Hart's examination of the *Cybele* has been so searching and the objections taken to it so numerous that our defence must necessarily be a rather lengthy one. For the sake of lucidity let us deal with his animadversions in sections. The chief counts in his indictment may be headed thus: *Climate*; *Irish Plant-names*; *Origin of the Cantabrian Group*; *Omissions*; *Miscellaneous Objections*; and our apologia may be conveniently arranged under corresponding heads.

CLIMATE.

Rainfall.—When preparing our section on climate for the second edition of *Cybele* we at first endeavoured to arrive at a trustworthy average annual rainfall for East and West Ireland, founded on data drawn from a numerous series of properly distributed stations and spreading over the same series of years. Failing to find sufficient data, we abandoned the attempt to arrive at averages and satisfied ourselves with the two generalisations, that the east is drier than the west, and that the Irish rainfall reaches a maximum in the south-west. The accuracy of our second generalisation is thus questioned by Mr. Hart on p. 28 of

his *Remarks* :—"Connemara is, so far as our knowledge goes, far and away wetter than the south-west (unless at altitudes unsuitable for comparison.) Kylemore, in Connemara, has a mean of 81·79 inches for sixteen years . . . No doubt there are valleys in the Kerry Reeks that would perhaps eclipse Connemara, but we have not got the proof." Now the required proof it so happens is to be had in Mr. Hart's own *Flora of Donegal*, where (p. 345) he gives us the average rainfall for the Gap of Dunloe as 91·5 inches, and goes on to say—"Parts of Kerry receive the heaviest rainfall in Ireland . . . Next to these the wettest portion would be found in Galway amongst the Twelve Bens . . . Kerry is nearly twice as wet as Donegal in its wettest parts. Galway is about intermediate."

Clearly we have to deal with two Mr. Harts—the author of the *Flora of Donegal* and the author of *Remarks on the Second Edition of Cybele*, and we find one of these, to use an eastern image, eating the words of the other. Which of them are we to believe? We think we may fairly claim that our generalisations on Irish rainfall still hold the field. No doubt these generalisations might have been supported by a more imposing display of statistics, and our whole section on climate might have been easily expanded to 100 pages in emulation of our critic, who has devoted no less than 67 pages of his *Donegal Flora* to tables of barometric pressures, of rainfalls, and of temperatures, marine and terrestrial. But after all climate is only of interest to the botanist in so far as it demonstrably affects plant distribution, and the majority of the readers of *Cybele* will rather bless than revile us for the terseness of our paragraph on this subject.

The Gulf Stream.—As for the Gulf Stream, we have only to oppose to the opinions of Dr. Murray and the Prince of Monaco cited by Mr. Hart, those of Dr. W. B. Carpenter and Mr. R. H. Scott, F.R.S., of the Meteorological Council. The former in his article "Atlantic Ocean," in the last edition of the *Encyclopædia Britannica* (vol. iii., p. 25) says :—"The same principle once admitted" [the principle of a great oceanic circulation, carrying the cold polar waters southward underneath a northward flow of warm water from the equator] "fully accounts for that amelioration of the cold of north-western Europe, which, as already shown, cannot be fairly

attributed to the Florida Current or true Gulf Stream.”¹ Dr. Carpenter (p. 20 of this article) considers the Gulf Stream “to be no longer recognizable to the east of the meridian of 30° W. longitude,” and attributes the transport of West Indian tree-trunks, fruits, &c., to the shores of western Europe to a surface drift sustained by the prevalence of S.W. winds. Our second authority, Mr. R. H. Scott, F.R.S., thus delivers himself in *Notes on Rockall (R.I.A. Trans., 1897, p. 63)*: “In reply to the question about the Gulf Stream, it is perfectly well defined up to say 50° W. longitude, but I contend no further.” We are quite content to differ from Mr. Hart, Dr. Murray, and the Prince of Monaco in such good company as that of Dr. Carpenter and Mr. Scott, and leave it to the reader to decide for himself under which banner he will enlist. We have no strong tendencies to iconoclasm, but since the Gulf Stream threatens to play as thaumaturgical a part in Irish meteorology as Finn and Cuchulainn play in Irish legend, it seems high time to submit its credentials to scientific scrutiny.

IRISH PLANT-NAMES.

This new feature in the *Cybele* is founded on inquiries begun by one of us many years before the preparation of the second edition was entered upon. It was with a full knowledge of the work already done in the same field by Threlkeld, Lightfoot, Wade, O'Reilly and Cameron that the inquiries were instituted; but as the investigator aimed merely at the fixing of the more prominent native plant-names *actually current in Ireland* it was impossible to make any use of these authorities. Even the latest of them, Cameron, in his *Gaelic Names of Plants*, 1883, though he gives in addition to the Scotch Gaelic names a large collection of Irish Gaelic names, does not indicate whether any one of them was taken from other than literary sources. Only one who has himself carried on such inquiries in the field can appreciate their difficulty, and how

¹ A more recent authority, Mr. Dickeson, in the *Quarterly Journ. Roy. Meteorol. Socy.* for October, 1899, contends that “the mild winters of our western coasts are not due to the heating of the air by contact with a surface of warm water, brought by a current from warmer regions . . . but to the fact that the air has itself come from these warmer regions, and is charged with abundant moisture, which sets free vast quantities of heat through condensation.”

imperatively they demand the exercise of caution and of patience, if error is to be avoided. The difficulty is two-fold ; first, one must catch correctly the series of vocal sounds which make up the spoken plant-name, some of the elements in the series being obscure or indeed quite elusive ; in the second place, one has to make sure that he applies the spoken name, where not merely generic, to the proper botanical species, and to arrive at certainty on this point it is often necessary to consult several Irish-speaking namers of the plant and compare their *dicta*. To these difficulties may be added a third, that of rendering the name into the accepted system of Irish orthography. Here a wide field for the imagination is often opened up, and one must carefully check the tendency to strain the rendering of the spoken sounds in such a way as to give the written word a meaning. In many cases one must be content to let the name remain purely symbolic.

All this is set down here merely to show that the admitted meagreness of the *Cybele* list of Irish plant-names is due to conscientiousness and a full appreciation of the difficulties of the subject. Mr. Hart, however, does not seem to feel these difficulties, for he tells us in his *Remarks* : "I have myself collected without difficulty, though at a considerable expense of time and travel, a large number of Celtic plant-names in Donegal which do not appear in the *Cybele*. Many will be found in an appendix to my *Flora of Donegal*." On turning to this appendix, which contains much interesting matter, we find such entries as the following : "*Barran a dhu*, Fibrous roots of bent or some other sand plant. *Futherin* (?) seaweed. *Meehal*, a yellow thick-clustered seaweed. *Paraban* (?) some herb, very good for making a plaster." Now Mr. Hart is quite justified in saying that such names as these, mere *nomina nuda* referable to no definite species, may be collected "without difficulty"; but then unfortunately the collection when made has no scientific value.

Farther on in his *Remarks*, when discussing *Euphorbia hiberna* (p. 37) and *Pinus sylvestris* (p. 41) he reverts to our treatment of current Irish plant-names. He charges us with both wrongly spelling and wrongly interpreting the native name *Bainne caoin* which we give as that now current for the Irish Spurge in Cork and Kerry, the head-quarters of the

species. It is not easy to unravel the paragraph in which this charge is made, so contradictory is it and full of unwarrantable assumptions. Mr. Hart's reasoning appears to be somewhat in this fashion: our name, *Bainne caoin*, is wrongly spelt because it is spelt differently from the name, *Buidhe na ningeán*, given by O'Reilly; the interpretation which we give of our name is wrong, because it differs from Mr. Hart's interpretation of O'Reilly's name. Now O'Reilly's name, as Mr. Hart himself admits in this very paragraph of his *Remarks*, is a purely generic one; but for the purpose of his argument, to prove, in short, that we are wrong, it is essential that the name should be made specific and should be applied to *Euphorbia hiberna*. This our critic accordingly proceeds to do, in perfect oblivion of his acceptance of the word as generic and, so far as we can see, without a shred of evidence; and having further assumed that our name and O'Reilly's are the same, the conclusion inevitably follows, that our Irish spelling is hopelessly wrong, unless we spell better than O'Reilly, and we cheerfully concede that any such assumption is inadmissible. Having thus convicted us of incompetence in spelling, there is little difficulty in convicting us of incompetence in translation. Mr. Hart, with great intrepidity, in our opinion, englishes O'Reilly's name into "the yellow wave-lover," while we english our name (conjecturally, with a note of interrogation) into "mild milk." It is obvious to the meanest capacity that "mild milk" is different from "the yellow wave-lover," and Mr. Hart's rendering being right ours must be wrong. Therefore we cannot be trusted either to spell or to translate Irish correctly. Is it necessary to assert the obvious fact that *Bainne caoin* and *Buidhe na ningeán* are utterly distinct names, and to point out that, this fact once grasped, Mr. Hart's argumentative house of cards topples to the ground?

Having in self-defence dealt thus unsparingly with our critic in the matter of the Irish Spurge, we are happy to be able to thank him for fresh information as regards the Scotch Fir. His evidence for the present use of the Irish name *guimhas* or *guibhas* (gyoos) in Donegal is most welcome; for in spite of Joyce's and Cameron's discussion of this question we did not feel quite satisfied as to the current Irish use of

the name for the living tree as distinguished from the dead bog-deal. Though we have little doubt as to the validity of our conclusion that the Scotch Fir as a native Irish plant "had become quite rare if not extinct in very early times," that conclusion can no longer be based on the absence of a native name for it from the spoken language. But it may fairly be based on its rarity as a component in Irish place-names. We are further indebted to Mr. Hart for his reminder that he has already recorded the survival in Co. Galway of the old name for the Irish Spurge, *Meacan buidhe* (Makinboy of Threlkeld, *anglice* yellow tap-rooted plant). We overlooked his interesting record of this in the *Journal of Botany* for 1873.

To conclude our remarks on this subject, we agree with our critic that an exhaustive work, botanical, philological, and historical on Irish plant-names would be of great interest, and one of us has already ventured to sketch the outlines of such a work in the hope that he may some day succeed in amassing materials sufficiently copious and trustworthy to justify publication.

ORIGIN OF THE CANTABRIAN GROUP.

However intimate one's acquaintance may be with the laws of plant-life and with the conclusions and theories of geologists, he can never hope to arrive at any very positive opinion on such a question as this. One must studiously guard against any approach to dogmatism in discussing it, and this we have endeavoured to do in our brief paragraph on the subject where we preface our suggestions with these words: "the hypothesis which regards them" [the Cantabrian group of plants] "as relics of a once widespread pre-glacial flora seems to be the one which, however open to objection, presents the least difficulty." We have little objection to make to Mr. Hart's discussion of this highly debatable question, one with which he is peculiarly fitted to deal by reason of his practical acquaintance with the Arctic flora. He points out most forcibly the great difficulty in the way of accepting the hypothesis we favour, the difficulty, that is, of imagining the Cantabrian group to have survived in Ireland throughout the last Glacial Period. It is a real difficulty; but it is, we conceive, an exaggeration of it to characterise the Cantabrian and Alpine groups as respectively

the most delicate and the hardiest members of our flora. Judged by the vertical range of its members in Ireland, the Cantabrian group is by no means so sharply distinguished from the Alpine in power of endurance, as Mr. Hart maintains. For instance, *Saxifraga umbrosa* ranges to 3,370 feet, *S. Geum* to 2,650 feet, *Pinguicula grandiflora* to 2,250 feet, *Daboecia polifolia* to 1,900 feet, *Erica mediterranea* probably to 1,000 feet; while on the other hand many of our alpine, accustomed in more thoroughly congenial climates to the protection of regularly recurring and persistent winter snows, show themselves impatient of exposure to frost in more temperate climates where this protection is often withheld. It is needless to say that the alternative hypothesis favoured by Mr. Hart is beset by peculiar difficulties of its own. No one who wishes to apprehend the great complexity of such questions should neglect to study Dr. Scharff's erudite paper *On the Origin of the European Fauna*,¹ a perfect treasure-house of the polyglot literature of distributional problems.

With a passing reference to one or two expressions in Mr. Hart's very interesting discussion of this question, we must hasten on to our next section. On page 30 he states that the chief peculiarity of the Cantabrian group of plants "is the accidental one that they do not now exist in the neighbouring island." The group being a distributional one it is quite inadmissible to speak of its essential characteristic—locality—as accidental. Again, on p. 33, after touching on the wisdom and veracity of plants which, we are admonished, should be let "speak for themselves" since "they know and they will tell no lies," Mr. Hart insists that hypothetical formula should give way to the "incontrovertible laws of nature." By all means, but the question is—what are the incontrovertible laws of nature in this complex and largely mysterious domain of plant distribution? And when we have got our wise and veracious plants into the witness-box, who is to interpret for us their inarticulate deliverances? Finally, on p. 31, Mr. Hart says that it was almost a pity to raise this debatable question at all in *Cybele*. If debatable questions had been rigorously eschewed the book could never have been written. Hardly a page of it is free from debatable matter: a whole

¹ *Proc. R.I.A.*, 3rd series, vol. iv., no. 3.

volume of debate—not always parliamentary in its diction—might easily be written on the Appendix alone; and after all for many readers these problems of plant distribution are as fascinating as the problems of metaphysics, and for a like reason, because they are well nigh insoluble. In any case, less than a page of *Cybele* is devoted to (or wasted on?) the discussion of the history of the Cantabrian group in Ireland.

OMISSIONS.

The charges made against us under this head are very numerous. To some of them we plead guilty; others, and by far the larger number, are not omissions at all in any damaging sense of the word. They are not oversights, that is, but deliberate exclusions made on principle. Let us first deal with the charges on this point brought against our *Introduction*. On page 29 of our critic's *Remarks* we are charged with the omission of two important plants, the Irish Spurge and the Killarney Fern, from our list of Irish Atlantic Type species (p. xlvii of *Cybele*). While we at once acknowledge our error as to the Killarney Fern, we wish to point to the inaccuracy of Mr. Hart's statement as regards the Irish Spurge. This is not classified either by Watson or by us as Atlantic, but as Local-Atlantic, or a Local species with an Atlantic tendency. If the type comparisons between the English and Irish floras are to be made at all a rigid adherence to the limits of Watson's types must be observed. Our error then on this point is only half as serious as Mr. Hart makes it appear.

Again, on p. 29, we are charged with having omitted from the Irish Highland Type list no less than four plants, *Aira alpina*, *Cochlearia alpina*, *Saxifraga hirta*, and *S. grænlandica*. Here, in his haste to correct us, our critic has stumbled himself, for *Aira alpina* is not omitted from our list; Mr. Hart has simply failed to discover it there under its thin disguise of *Deschampsia alpina*. As for the remaining three plants, they do not belong to the Highland Type at all, and this can be easily seen by reference to our standard, Watson's *Compendium of the Cybele Britannica*, 1870, where the latest revision of the type is given. When Mr. Hart, at the end of his critical paragraph, on this point asks: "Why should our Irish mountains be deprived of the credit of yielding these plants,"

the answer is simply this—that we did no injustice to Ireland in excluding them, but merely a justice to England.

Farther on, however, we come to a charge which, unlike this one of imaginary injustice to Ireland, is fully proved against us. On p. 29 Mr. Hart draws attention to our omission from the list of alpine descending to sea-level in Ireland of the following four species: *Saxifraga oppositifolia*, *Arctostaphylos Uva-ursi*, *Isoetes lacustris*, and *Carex aquatilis*. We are certainly in error here. These plants should be added to the list on p. xlv of our *Introduction*, and Mr. Hart is entitled to our thanks for the detection of this oversight.

Passing on to p. 36 of the *Remarks*, we are confronted with a portentous list of no less than 44 items described by our critic as “a few omissions, &c., which are not dependent on information unavailable for the purposes of the *Cybele*.” On analysis this list turns out to be a critical miscellany, by no means restricted to supposed omissions of our critic’s records. Of these, however, it includes some 23 items which we shall deal with in groups. The following 6 were omitted as dubious for various reasons: *Ranunculus heterophyllus*, *R. Lingua*, *Thalictrum flexuosum*, *Helianthemum vulgare*, *Saxifraga hypnoides*, and *Atriplex farinosa*. Eleven others were omitted as superfluous, i.e., *Papaver Argemone*, *Nasturtium palustre*, *Sisymbrium thalianum*, *Viola hirta*, *Andromeda polifolia*, *Atriplex portulacoides*, *Juniperus nana*, *Epipactis latifolia*, *Ophrys apifera*, *Carex riparia*, and *Phleum arenarium*. It seems to us that Mr. Hart has least of all Irish botanists any reason to complain that his work has not been given due prominence in the 2nd edition of *Cybele*. That it was necessary in compiling the book to make a selection from the vast mass of available material is sufficiently obvious. The remaining 6 items of these 23 are perhaps true omissions, that is, omissions by oversight. They are as follows: *Arenaria trinervia* and *Festuca sylvatica* (omitted for District IV.), *Taraxacum officinale* var. *palustre* (omitted for XI.), *Anthemis nobilis* (vertical range omitted), *Agrostis vulgaris*, var. *pumila* (not credited to Mayo and the Galtees), and *Selaginella selaginoides* (descent to sea level in Donegal omitted). This small number of omissions will be reduced to 4 if, as we are inclined to believe, the MS. referred to by Mr. Hart as lent to one of the editors did not reach him early enough to be availed of, and two of the omitted records,

those for the varieties of *Taraxacum* and *Agrostis* are certainly of little importance.

MISCELLANEOUS OBJECTIONS.

Having thus dealt with the numerous charges of omission brought against us, there remain many scattered objections to be considered. First of all let us dispose of the remaining 21 items in the list of 44 already partly discussed in the preceding paragraph. Six of these remaining items deal with highly debatable points on which we are content to differ from our critic. These are *Bartsia viscosa*, *Melampyrum sylvaticum*, *Euphorbia amygdaloides*, *Salix phylicifolia*, *S. Moorei*, and *Eriophorum latifolium*. Four other items, in so far as they impute error to us, are instances of purely captious criticism. These are, *Anchusa sempervirens*, *Mertensia maritima*, *Orobanche minor*, and *Trichomanes radicans*. The first species we distinctly mark as naturalized, and give ample evidence to justify its more favourable treatment in XII. than in XI.; the second species we did not state to be decreasing in Donegal. We said, and we now reiterate, that it is decreasing in Ireland as a whole. Mr. Hart himself (*Flor. Donegal*, p. 204) fears that it is extinct in one of its Donegal stations. The third species, *Orobanche minor*, in all the numerous records that came under our notice (save Mr. Hart's) was set down as parasitic on *Trifolium pratense*. We passed over Mr. Hart's record as superfluous, our stations for District V. being already numerous enough, and did not "gratuitously" make a general statement in conflict with his evidence, as he accuses us of having done. We simply overlooked his reference to *Ononis* and *Lotus*. The objections to our treatment of the fourth species, *Trichomanes radicans*, we do not fully understand. Our offence is apparently nothing more serious than this, that we did not credit Mr. Hart with the publication of Mr. Mahony's discovery.

In the case of *Artemisia vulgaris*, our statement "nowhere a common species" must be modified, as the plant appears to be common in the North. Another item, *Lithospermum arvense*, is a correction of one of our critic's mistakes. In dealing with *Nepeta Glechoma*, *Arum maculatum*, and *Carex stricta* it is very difficult with the available materials to find a terse, yet accurate, expression for their general distribution in

Ireland. The first two may be, as Mr. Hart says they are, rare in the West, and the third, rare in most parts of Ireland, away from the large lakes or rivers; but we consider that our word, "frequent," most fully expresses their known standing in Ireland as a whole. The generalisation that the three species, *Lysimachia vulgaris*, *Euphorbia Paralias*, and *Parietaria officinalis* are rare in Donegal we did not think it prudent to adopt before we had seen Mr. Hart's final views on the subject in his county flora. The Flora, unfortunately, did not appear until the 2nd edition of *Cybele* had passed through the printer's hands. Our critic is in error in supposing that *Lysimachia vulgaris* is in District XII. confined to Lough Neagh, as there are two recent records for stations in County Down remote from the Lough. He is also in error in supposing *Euphorbia exigua* to be absent from West Ireland: it occurs in District VI., and its rarity in the West we have sufficiently indicated by the statement in *Cybele*: "not yet recorded for Kerry, West Galway, Mayo, or Sligo." Finally, last item in this long list, comes *Empetrum nigrum*. We have fully noted in *Cybele* the occurrence of this species at low levels in many parts of Ireland; but we still consider it to be essentially a mountain plant in the West, as well as in the East, and rare at low levels.

Page 40 of the *Remarks* presents us with another list, chiefly made up of plants which, in Mr. Hart's opinion, have been improperly relegated to our Appendix. We need not discuss this list in detail, as it deals almost entirely with debatable matter; but we feel bound to more fully notice one item, *Helianthemum vulgare*. We still consider it inadvisable to concede to this plant a place in the Irish flora proper. Fuller information is needed, above all, as to the quantity in which it appears in the Donegal station. We do not know whether Mr. Hart found a thousand plants there or only a single plant; and we hope he will further examine the craggy district he refers to at the earliest opportunity and publish the results of his investigation. In the paragraph introductory to this last list, we are admonished (p. 39) that it would be a good rule to relegate to our Appendix all unconfirmed records of Wade, Smith, and Keogh. This is precisely what we have done in the case of Smith and Keogh (the instance of

Euphorbia hiberna is no exception, as we hold that the trustworthy Limerick records for the plant amount to a confirmation); and Wade's authority seems to us entitled to so much greater weight than either Smith's or Keogh's, that in many cases we do not hesitate to accept from him unconfirmed records if they have no obvious improbability.

In discussing our comparison of the floras of Districts XI. and XII. (p. 34), Mr. Hart qualifies as erroneous certain of our statements founded on an accurate survey of the information then available. The word "erroneous" is not justly applicable here, unless it be an error to remain ignorant of what has not been divulged. Again, our method of comparing the Irish and English floras is taken exception to in the footnote to the same page, Mr. Hart once more resenting an imaginary injustice to Ireland. Some standard must be taken, and when taken, moreover, must be rigidly adhered to throughout the various comparisons made. We have taken Hooker as standard, and it is, of course, immaterial how he treats the Hawkweeds, since his treatment affects the English and Irish floras in the same way. The case of Ireland *versus* England is no whit strengthened by deposing Hooker in favour of the London Catalogue—Ireland's gain in *Hieracium* forms being fully balanced by England's gain. Mr. Hart again returns to this subject on pp. 41 and 44, where he discusses various additions to be made to the Donegal flora. In both of his numbered lists, those on pp. 36-41, and on pp. 42-44, mere varieties, nowhere counted by us for comparative purposes, are included, 2 in the first list and 2 in the second, the effect being to improperly raise the Donegal total by 4. In the first list the numbered additions are 11, yet Mr. Hart in his summing up on p. 41 counts them as 12. But one plant, *Helianthemum vulgare*, is numbered and counted twice, so that the true number of his additions is neither 11 nor 12 but 10. At the same time, 8 of the additions in this first list are plants excluded by us and reintroduced by Mr. Hart, who seems to overlook the fact that if every patriotic district botanist is to revise our Appendix thus no benefit can accrue to any of them. There is, at all events, this advantage in accepting our views as to excluded species, that the principles on which we acted, whether just or unjust, were laid down at the very

threshold of our work, and were applied with a strenuous striving after impartiality throughout the 12 districts, the result being that comparisons between their various floras may be made with a fair approach to accuracy. With the fullest desire to do justice to the Donegal flora, we cannot place its total number of species and sub-species, as at present known, at a higher figure than 753, that is, 10 under Mr. Hart's estimate.

We are not called on to discuss in detail the final list on pp. 42-44 of the *Remarks* dealing with additions to the Donegal flora published after the 2nd Edition of *Cybele* had passed through the press. Our rejoinder has already run to a great length, chiefly for this reason, that a failure on our part to meet any one of our critic's objections would infallibly have been taken by a large mass of readers as an admission of error. In conclusion, we can only express our deep regret that the *Flora of Donegal* did not appear before the 2nd Edition of *Cybele* had gone to press. Mr. Hart's book, as we know, was in the press for fully three years and a half, while the new *Cybele*, a much larger and more complex work, passed through the printer's hands in less than eight months, although the greatest pains were taken to ensure typographical accuracy by repeated proof-revision. But for this unfortunate delay in publishing the Donegal Flora, we should have no reason to regret the incompleteness of *Cybele* as regards North-west Ireland.

Dublin.

THE IRISH FLORA AND THE GLACIAL PERIOD: A REJOINDER.

BY R. F. SCHARFF, PH.D.

MR. HART wishes the question as to whether our most tender species of plants have existed throughout the Glacial Period or no referred to those competent to form an opinion, and a vote taken on the subject, the minority to abide by the decision of the majority. As I cannot believe that Mr. Hart would propose such a scheme otherwise than seriously, I would point out that this would be a most unscientific

procedure, and crush all independent thought. Moreover, the subject is so vast and intricate that we are not able to decide the question at present with any degree of certainty. Most geologists, judging from purely geological reasoning, hold that the climate of Ireland was very cold during the Glacial Period, and that both plants and animals were exterminated, and could, therefore, only have migrated to Ireland since that period. They tell us that we must fit in our theories according to their views. This seems to be the kind of coercion of our reasoning powers favoured by Mr. Hart! Why should not we botanists and zoologists bring together all the possible facts and data at our command in order to attack the problem from another stand-point? I have attempted to rouse an interest among zoologists and botanists on the subject, in order to induce them to investigate it from their own stand-point, and have published my views in the paper referred to by Mr. Hart, and more recently in book form. Both of these have been ably reviewed and criticised in the *Irish Naturalist*. As I have stated in my book, the eminent Swedish botanist, Prof. Nathorst, and also the well-known Arctic traveller, Colonel Feilden, are of opinion that part of the Greenland flora survived the Glacial Period in that country. If any flowering plants survived there, why not in Ireland? Mr. Hart looks upon the Killarney Fern as the chief stumbling block to the survival theory. But not long ago, Mr. Moore, the able Curator of the Dublin Botanic Gardens, told me that the roof of the fern-house in which he stored these ferns had been once smashed during very severe weather in winter, so that the tender plants were exposed to great and sudden cold, without their being injured thereby. My statement as to the County Londonderry containing most of the Northern animals and plants will probably have to be modified to "North-western Ireland" instead of "Londonderry." This, however, was not a serious mistake, and cannot affect the general drift of my views.

Science and Art Museum, Dublin.

NOTES ON IRISH COLEOPTERA.

BY REV. W. F. JOHNSON, M.A., F.E.S.

MR. BUCKLE'S list of beetles from the Lough Foyle district (*ante*, pp. 2-11) is a most welcome addition to our knowledge of the coleopterous fauna of Ireland. The district is one of varied character, comprising mountains, bogs, and coast sand-hills; these last are always a happy hunting-ground for the entomologist. That Mr. Buckle has made good use of these advantages is evidenced by the large number of species that he has added to the Irish list and the many good things he has taken. On these captures and a few other points I would wish to offer some observations. *Carabus nitens*, L., is a pleasing capture, as being a very beautiful insect, and also as confirming the old records of Haliday and Patterson, who took it in the neighbourhood of Belfast, and of Canon Bristow, who obtained it on the Dungiven Mountains, Co. Derry. The *Carabi*, like many other Geodephaga, are very active just at dusk, and I was told by an English correspondent that he found it a good plan to look for *C. nitens* at that time. They are very fond of running over paths or roads, and I have seen *C. nemoralis*, Müll., and *C. granulatus*, L., quite in numbers on a road in early summer at twilight. The late J. F. Dawson, in "Notes on British Geodephaga" (*Entom. Annual*, 1856), recommends sweeping at night, and quotes Baron Chaudoir, who advocates spreading a large white cloth (sheet or tablecloth) on the ground at night, and placing a brilliant light thereon; by this method M. Chaudoir says that he took many good species.

It is somewhat remarkable that *C. clathratus*, L., was not met with, for turf bogs are its haunt, and it has been taken pretty freely in Donegal. I had hoped to have seen *Pelophila borealis*, Payk., and *Cælambus v.-lineatus*, Zett., in the list; but, no doubt, further research on Mr. Buckle's part will turn up these, as well as other desirable Coleoptera. *Pelophila* is often found in company with *Blethisa*, but it likes *firm* mud and stones, while *Blethisa* will live in swampy places among herbage. The non-occurrence of *Cælambus v.-lineatus* is rather puzzling, as it has occurred very generally in Ulster. I have taken it in company with *C. inæqualis*, F.; in fact, where

I got the latter I generally expect to meet with the former ; very probably the ensuing season will bring a record of its capture.

In connection with these *Cælambi*, can no one turn up *Cælambus versicolor*, Schall. (*reticulatus*, F.)? This pretty little water-beetle is recorded by Haliday from near Belfast ; there is also a specimen in the Belfast Museum, which was taken by Mr. Hyndman probably near Belfast, and in M'Nab's Dublin list is the record "Canal, Dublin" ; since that time it has been conspicuous by its absence. I may mention that a convenient point of distinction between it and *C. v.-lineatus*, its close ally, lies in the prosternal process, which in *C. versicolor* is elevated, and in *C. v.-lineatus* is depressed (*vide* Sharp, "Dytiscidæ," *Sci. Trans. R.D.S.*, 1882).

Mr. Buckle speaks of not observing *Hydroporus Davisii*, Curt., or *H. septentrionalis*, Gyll., coming to the surface of the water for air ; the fact is, that it is very difficult to see these small water-beetles coming to the surface except in clear water where there are no weeds, for they come up and go down again so quickly that the least bit of weed prevents their being seen.

Mycetoporus nanus, Er., was recorded by me from Coolmore, Co. Donegal (*Ent. Mo. Mag.*, 1896, p. 156), and *Ceuthorrhynchus viduatus*, Gyll., from Armagh (*Ento. Mo. Mag.*, vol. 24, p. 195.)

Phytosus balticus, Kraatz., is an interesting capture especially in view of Mr. G. C. Champion's remarks concerning it and *P. nigriventris*, Chev. (*Ent. Mo. Mag.*, 2nd series, vol. 10, p. 1). Mr. Champion gives "Co. Meath" as an Irish locality, which, with Mr. Buckle's record, are the only notices of its occurrence in Ireland that I know of. It seems not improbable that further research may produce both species from these localities, and possibly from others. It appears to be entirely a sea-coast insect. *Bledius erraticus*, Er., is a decidedly rare beetle. Canon Fowler gives only four localities for it (*Brit. Col.*, ii., p. 373), nor do I know of any record of its capture since, except my own from Coolmore (*I. Nat.*, vol. iv., p. 97), which is the only other Irish record except Mr. Buckle's. It is very gratifying to know that he met with it in large numbers. At Coolmore there was a large colony among the sandhills quite away from the sea-beach proper.

Bledius longulus, Er., is, as far as I know, a new record for Ireland, and is by no means a common insect in Great Britain.

Perhaps the most interesting of all Mr. Buckle's captures is *Otiorrhynchus auropunctatus*, Gyll. This fine weevil has been taken on the east coast (*I. Nat.*, vol. iv., p. 213) by Messrs. Cuthbert and Halbert. That a Pyrenean species should occur on our east coast was remarkable enough, but to find it on our northern coast is more remarkable still, and proves the correctness of Mr. Carpenter's remark (*l.c.*, p. 215) "that its presence here cannot be ascribed to recent introduction," and points to the probability of its occurrence at intermediate stations. Here is an opportunity for some of our friends of the Belfast Naturalists' Field Club. The insect has been found in Dublin, Meath, Louth, and Londonderry; let them complete the chain by finding it in Down and Antrim.

I see that Mr. Buckle took *Philopodon geminatus*, F. It would be interesting to know if he met with the large white form which has been met with in some localities.

I must congratulate Mr. Buckle most heartily on the success of his efforts, and I hope we shall soon hear of more good captures, meanwhile *macte virtute*.

In the report of the Dublin Naturalists' Field Club (*ante*, p. 19) the following remark occurs—"Mr. Cuthbert got *Rhopalomesites Tardyi* in Alder, an unusual home for this weevil."

I have taken it in Alder, and the following quotation will show that it is not averse to that tree; in fact, I don't think it cares so long as the tree is in a suitable condition for attack what kind it is:—

"As another example of the same kind may be mentioned, the unexpected recognition, at Craumore, of *Cossonus Tardii*, by my friend and fellow-member, Robert Templeton, Esq., R.A. It was found by him in June, 1829, on the under side of an alder which lay in the farm-yard and had been stripped of its bark. This insect is one of the *Curculionidæ* or weevil tribe. It was first discovered in July, 1822, under the bark of decayed hollies near Powerscourt Waterfall, County of Wicklow, by the late James Tardy, Esq., of Dublin, in company with N. A. Vigors, Esq., who conferred its specific name in honour of his friend. Mr. Curtis remarks—It appears, like all wood-feeding insects, to be extremely local; for Mr. Tardy, in a letter, says—'I have in vain sought for it in places abounding as much in holly, and in similar situations, in the same county.'

"In fact, I believe the Irish *Cossonus*, for so it is called, had not been detected in any locality, except that where it was originally discovered, until it fell under the observation of Mr. Templeton. It is still taken at Cranmore,¹ in precisely the same situation where it was first observed, and usually in little groups of four or five individuals, ranged together side by side. It is not, however, strictly confined to one spot, but has also been taken in the adjoining garden, and is particularly abundant under the decaying bark of alders."—("Insects mentioned in Shakspeare," by Robert Patterson, F.R.S., Treasurer of the Natural History Society of Belfast: London, 1838.")

I should like to call the attention of Irish coleopterists to the remarks of Mr. G. C. Champion, F.Z.S., with regard to *Diglossa*, Haliday, or *Diglotta*, as Mr. Champion proposes to call it (*Ent. Mo. Mag.*, 2nd series, vol. x, p. 264). He points out that the difference in length of elytra, which used to be relied on to separate the species, is not a constant character, gives the points of difference and the changes in nomenclature, and shows that the two species are now *D. mersa*, Halid. (*submarina*, Fairm.), and *D. sinuaticollis*, Muls. and Rey. (*crassa*, Muls. and Rey.). Both have been taken in Ireland, *D. mersa* at Portraine and Baldoyle, while of *D. sinuaticollis*, Canon Fowler (*Ent. Mo. Mag.*, xx., p. 168) writes that M. Javet had specimens sent him from Ireland by Haliday, and Mr. Champion (*l.c.*) states that "there is a small form in Mr. Mason's collection, probably found by Haliday in Ireland." It seems likely that these specimens were found, like those of *D. mersa*, in Co. Dublin, but it is not impossible that they may have been taken on the coast of Co. Down; consequently it is an open question, and remains for solution by the Dublin and Belfast field naturalists, so let them polish up their optic nerves, and sally forth on sunny days and see who will win.

Poyntzpass.

¹ Cranmore is now part of Belfast.

BRITISH DRAGONFLIES.

British Dragonflies (Odonata). By W. J. LUCAS, B.A., F.E.S.
Pp. xiv. and 356, 27 coloured plates, and 57 figures in text. London :
L. Upcott Gill, 1900. Price £1 11s. 6d.

Students of the less well-known orders of British insects have received much encouragement in recent years by the publication of reliable text-books dealing in detail with the species which inhabit our islands. Mr. Lucas' long-promised monograph on our Dragonflies will take a high place among such books.

The first fifty-four pages are devoted to introductory matter, the life-history of Dragonflies, the forms assumed by their eggs and nymphs, the structure of the imago, and the place to be assigned to the group among the insects generally. Mr. Lucas is undoubtedly right in claiming for them ordinal rank. The chapter on the early stages is especially good, and a synoptical table of the nymphs of the various British species should prove useful. The account of the structure of the imago is rather weak morphologically; one does not expect nowadays to have the "lower lip" of an insect described as an unpaired organ comparable to the labrum. The internal organs are almost altogether neglected.

Careful synoptical tables of the families, sub-families, genera and species, lead on to the systematic portion, which occupies the bulk of the volume. The author may be congratulated on the full way in which he has dealt with each species; he traces the synonymy, transcribes the diagnosis of the original describer, gives careful original descriptions of both sexes of the imago, as well as of the egg and nymph when known, and furnishes interesting notes on habits, migration, and distribution. As the account of each species necessarily occupies several pages, specific names should have been used as page-headings, in addition to the generic titles. In nomenclature Mr. Lucas follows De Selys Longchamps and M'Lachlan, rejecting the replacement of *Gomphus* by *Aeshna* and *Calopteryx* by *Agrion*, which Kirby believes to be required by the law of priority. Though in our own two or three papers on Dragonflies we followed Kirby, we now consider that eminent systematist to have needlessly upset established usage. Mr. Lucas, however, is not justified in retaining *Ischnura* as a generic name among the Odonata; it belongs properly to a genus of scorpions, and Kirby's *Micronympha* must be substituted.

The distribution of each species within the British Isles is carefully given, so far as known, under counties for England and Scotland, and provinces for Ireland. With regard to Irish records, Mr. Lucas has had to rely almost entirely on the notes in De Selys Longchamps' "Libellules d'Europe," and on King's "Neuropterous Fauna of Ireland." Very little has been done since the publication of the latter work in 1888 to extend our knowledge of Irish Dragonflies, and such large and conspicuous species as *Libellula depressa* and *Cordulegaster annulatus* still rest their claim

to a place in the Irish list on De Selys Longchamps' testimony. One species which Mr. King seems not to have seen in Ireland, but which is recorded by the great Belgian entomologist from this country, we can certify from personal observation to be rather widely distributed here—the familiar *Calopteryx virgo*. We must protest against the inclusion of the Channel Isles in Great Britain; geographically they most undoubtedly belong to France. And it is to be regretted that, except in a few cases, the foreign range of the species is not mentioned. Mr. Lucas seems to ignore the "Lusitanian" element in our fauna, as he expresses surprise that a south-western form like *Oxygastra Curtisi* should occur in the British Island at all. To students of distribution it is of great interest to find a Dragonfly belonging to the same faunistic group as *Helix pisana* or *Eurynebria complanata*.

The volume concludes with useful practical chapters on breeding the nymph, and preparing the imago for the collection. The illustrations are all good, the coloured plates being exceptionally clear and well-executed. We have no doubt that this excellent monograph will be heartily welcomed by all entomologists, and that encouragement will thereby be given to the study of an order of insects remarkable in the interest of their structure, life-history, and habits.

G. H. C.

SLIME FUNGI.

The Mycetozoa. By the RT. HON. SIR EDWARD FRY and AGNES FRY.
Pp. i.-viii., 1-82, with twenty-two figures in the text. London:
Knowledge Office, 1900.

This little book, costing only one shilling, forms an excellent introduction to the study of a group of interesting organisms now generally regarded as perhaps the lowest of the fungi. There is probably no group of plants better supplied with illustrated guides to aid in its investigation than this one of the slime fungi. Lister, Masee, and now, in America, M'Bride, have prepared well-illustrated text-books, and to these the book under consideration serves as a useful introduction. Though elementary it yet contains nothing that must be unlearned when the larger books are taken in hand. The illustrations are distinctly good, and add much to the educational value of the book. The Mycetozoa have been almost entirely neglected by our Field Club members, though full of interest from many points of view. Recorders of additions to the Irish Flora have almost a clear field before them, and, once made familiar with the use of the compound microscope, can become their own instructors in this peculiar group. One member of the group—*Plasmodiophora brassicae*, Wor.—is the cause of the well-known disease in turnips, &c., called "finger and toe," "aubury," "club-root," &c., a disease very prevalent in the West and other parts of Ireland. Other plant-diseases have been attributed to other slime fungi, but the group is chiefly of interest to the lover of natural history, and it is to be hoped that Sir Edward Fry's easy and pleasant introduction will cause some reader of the *Irish Naturalist* to make a hobby of the Irish Mycetozoa.

T. J.

OBITUARY.

PROFESSOR J. F. HODGES, M.D.

The late Dr. Hodges was for many years a very well-known member of Belfast society. He began life as a practising physician in Downpatrick, having studied at Dublin and Glasgow. Subsequently he studied agricultural chemistry under Baron von Liebig, and took out the degree of M.D. in the University of Giessen. Returning to Ireland, he took a leading part in founding the Chemico-agricultural Society of Ulster in 1845, and was appointed professor of chemistry in the old Belfast College, and shortly afterwards he exchanged this post for the chairs of agricultural chemistry and medical jurisprudence in Queen's College, Belfast, which chairs he occupied till his death. He was the author of several books on agricultural chemistry, and his important researches in this science brought him honours from almost every European country. He held for many years the post of Government analyst, and was also analyst for the City of Belfast, and for five adjoining counties. He passed away in December, at the ripe age of 84 years.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include Long-eared Owls from Miss Bowerman and Mr. P. Grove, a Badger from Mr. R. J. Ussher, and a pair of Tigers from the Nizam of Hyderabad (given through Lord Roberts). A Llama has been born in the gardens, and a pair of Ostriches, a Bactrian Camel, and a Kangaroo, have been bought.

4,429 persons visited the gardens in January.

The Annual Meeting of the Society was held on January 30th at the Royal College of Physicians, and the Report of the Council then presented records most satisfactory progress. The admissions to the gardens show an increase of 24,000 visitors, and the receipts of £360 as compared with those of the previous year. This advance is justifiably ascribed to the increased attractions in the gardens. A new house for Ungulates has been built, and the Bears' dens have been greatly improved; while the Haughton Memorial Building, with its pleasing outdoor cages and upstairs refreshment-room (now open on Sundays as well as week-days), has proved a great pleasure to visitors. The Council hope soon to be in a position to erect a new Lion house, which will cost at least £1,500. The breeding-stock of Lions has been strengthened by the importation of a Nubian male, "Prince"—who has become the father of three fine cubs by the imported Somali lioness "Germania." The old Dublin strain is represented by another litter of three by "Cæsar," out of "Hypatia." The latter lioness unfortunately refuses to rear her offspring, but a satisfactory foster-mother has been found in an Irish Red Setter. The comparison between the Dublin-bred Lion, "Cæsar" and "Prince," will be interesting to zoologists:—

"By the process of artificial selection which has been carried on in Dublin, the size of the lion, and also the height of the hind-quarters, has been considerably increased; but there has been a loss in the depth of the chest, and in the strength of the forequarters."

The young Camel born on the 6th March, after a gestation of 386 days (the first event of the kind in Ireland) unfortunately died when six days old, and the mother also succumbed a few months later. Great regret is expressed at the death of the Chimpanzee, "Tom," and the rare Hainan Gibbon—which had both lived nearly five years in the gardens. We may mention that the latter specimen may now be seen stuffed in the Dublin Museum, while the dead Chimpanzee has been exported to Cambridge.

LIMERICK FIELD CLUB.

JANUARY 9.—ANNUAL MEETING AND CONVERSAZIONE.—The Seventh Annual Meeting of the Limerick Field Club was held in the Athenæum. There was a large attendance of members. A collection of botanical, geological, and entomological specimens, photographs, and scientific apparatus were shown. The Rev. J. Dowd, B.A., in the absence of the President, Dr. W. Fogerty, took the chair. Mr. F. Neale, Hon. Secretary, read the annual report, of which the following is an abstract:—"The Committee, at the close of another year, are again able to state that much interest has been taken in the Club, its winter meetings and summer excursions having been very well attended. They have also, however, again to draw attention to the continued scarcity of workers, and seriously ask members to identify themselves as students with some section of the Club. Your Committee, after full and careful consideration, have decided to recommend that Rule 6 be altered, so as to provide that each year shall end with the month of September, and that each member shall contribute a subscription of five shillings per annum. On the larger but still very moderate fee, your Committee hope it may be possible to increase the usefulness and activity of the Club, and to arrange for the better, if gradual, furnishing of its room with accommodation for specimens and photographs, as well as the hire or purchase of diagrams, &c., for lectures. It is also desirable that some books of reference should be available in connection with the Club, as well as magazines and periodicals bearing on the objects of its various sections. Your Committee have pleasure in reporting the completion of arrangements with G. H. Carpenter, B.Sc. (London), of the Science and Art Museum, Dublin, for the delivery by him of a course of six lectures on zoology, in March next. The membership of the Club on the 30th September, 1898, was 243, the number to same date in 1899 being 270.

"Several botanical specimens have been added to the Club Herbarium during 1899, more especially from amongst the plants characteristic of the Burren district of County Clare, of which several examples are on view this evening.

"An interesting addition has been made to the fauna of this locality—a cave-dwelling spider (*Meta Menardii*), of which nests and specimens were taken during the year near Kildimo, Co. Limerick, and nests with

eggs near Quin, Co. Clare. Several species of butterflies not usually common with us occurred during the past summer, one of which, the Clouded Yellow (*Colias edusa*), is of more than ordinary interest. Our single specimen is from Mountshannon, where it was taken early in August, but it occurred also at Adare, Limerick, and Foynes. Another butterfly, the Painted Lady (*Pyrameis cardui*), has been noticed in the past year at Cratloe, Mountshannon, and elsewhere in this district, only one other example having been observed since 1890, near Kilkishen, Co. Clare. A full-grown caterpillar of the Brimstone Butterfly (*Gonoptyx rhamni*) was found when the Club visited Holy Island, Lough Derg, on the 13th July, additional specimens having been obtained later in the season; also near Mountshannon, on which occasion they were seen on the same day in three stages—larva, pupa, and imago.

"During the year a notice has appeared in one of the scientific magazines as to a member of the grasshopper family swimming in water. This habit had been reported by this Club on several occasions, the first of them being about six years ago; and it is satisfactory to have it confirmed now, as some doubt was thrown on the accuracy of the record at the time.

"Good work has been accomplished by the Photographic Section of the Club, members of which have furnished illustrations for the valuable work on St. Mary's Cathedral published during the year by the Rev. James Dowd, B.A. Several geological slides prepared by our members have been accepted as suitable by the committee of the British Association for the Advancement of Science.

"The Archæological Section of the Club has not developed to the extent hoped for, and it appears difficult to arouse an interest in connection with it or in the study of local history.

"The following meetings took place during the year:—January 10th, '99—Sixth Annual General Meeting. January 31st, '99—"A Ramble through some of the Ancient Monuments of Kerry with a Photographer," by Mr. P. J. Lynch, M.R.I.A. February 14th, '99—"Architectural Photography." March 14th, '99—"Practical Points in Exposure, Development, and Printing." March 28th, '99—"Historic Limerick, The Old Town," illustrated with lantern transparencies, by Rev. James Dowd, B.A. April 10th, '99—Exhibition of Prize Lantern Slides. October 31st, '99—"The Life History of Ferns," illustrated, by the President. November 14th, '99—"Transformation Scenes, or Chapters in Insect Life," by Mr. John L. Copeman, Vice-President, Cork Field Club. November 28th, '99—"Common Objects of the Sea Shore," illustrated by lantern slides and specimens, by Mr. Wm. Gray, M.R.I.A., Hon. Sec., Belfast Field Club. December 12th, '99—"Archæology," by Rev. Timothy Lee, Administrator.

"EXCURSIONS.—April 20th—Broadford, *via* Parteen and Sallybank. May 4th—Ballycar and Newmarket. June 8th—Scattery Island. July 13th—Holy Island, Lough Derg. July 27th—Clare Glens.

"The Club *Journal*, issued in June last, is held by common consent to have been the best yet published. It contained matter representing

each section, and several good illustrations, these latter being in connection with an address on "Old Limerick," delivered during the winter session."

The report was adopted.

The following were elected officers for the year 1900:—President—Dr. W. A. Fogarty. Vice-Presidents—Miss Alice Doyle; Rev. Timothy Lee, Administrator. Hon. Treasurer—Mr. Joseph Stewart. Hon. Secretary—Mr. Francis Neale. Hon. Secretary of Photographic Section—Dr. G. J. Fogarty. Committee—Miss Bunbury, Miss Ebrill, Mr. W. Ebrill, Mr. P. J. Lynch, C.E.; Mr. J. Fitzgerald-Windle, C.E.; Mr. George Scott, Mr. B. Barrington.

The following were the exhibits:—Selected specimens of dried plants from the Club Herbarium; a collection of local limestone fossils; lantern slides, prints, and enlargements, by members of the Photographic section; Miss Bennis—Mounted examples of mosses, &c.; W. W. Cooke (Pigott & Co.)—Phonograph; W. A. Fogarty, M.A., M.D.—Microscopes; Miss Garnett—A potato; Miss Haughton—Abnormal *Calluna vulgaris*; Mrs. Neale—Fasciated willow stems; F. Neale—Butterflies, *Colias edusa*, *Pyrameis cardui*, *Gonopteryx rhamni*; nest with eggs of cave spider *Meta menardii*.

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 14.—The President (R. Ll. Praeger, B.A.) in the chair. About forty members and visitors were present.

Prof. GRENVILLE A. J. COLE read a paper entitled "The Floor of a Continent, with special reference to the older rocks of Ireland." The paper was illustrated by lantern-slides. Prof. Cole explained how little we know as to the real primitive crust of the globe. Even the oldest masses that are brought by earth-movement to the present surface may have been formed by mutual intrusion of molten rocks, long after the first consolidation of the crust. The old crust may have been broken up again and again, before our earliest surviving sediments were laid down. Various Archæan areas in Europe were described and illustrated, and Sir A. Geikie's views were quoted, to the effect that the ancient gneiss of Loch Carron, in Scotland, includes earlier sediments, and is not in itself a fundamental rock. The author described his own similar conclusions, derived from a study of eastern Tyrone and southern Donegal. The sedimentary or schistose series included in the Irish gneiss may well, however, be of Archæan age. It is questionable if we know anywhere, even in the American Laurentian, a truly "fundamental" gneiss. As yet, with our knowledge of some twelve miles at most of the thickness of the present crust, we are worse off than a fly crawling on the dome of St. Peter's, and endeavouring to estimate the nature of the complex structure beneath his feet. Dr. W. R. EVANS and Dr. A. H. FOORD spoke on the subject of the paper.

Mr. W. A. Cunningham, Mrs. Herdman, Mrs. W. P. Robinson, and Miss J. F. Thomson were duly elected members of the Club, and two candidates were nominated for election at the next meeting.

NOTES.

We have pleasure in drawing attention to the excellent plate which accompanies Mr. Wright's paper in the present number. The half-tone block from which it is printed was presented to the *Irish Naturalist* by the makers, Messrs. W. and G. Baird, of Belfast, who have recently set up the most complete installation of process-block machinery to be found in Ireland. The excellence of their work is sufficiently shown by their reproduction of Mr. Welch's drawing.

BOTANY.

*MOSESSES.****Sphagnum medium*, Limpr., in Ireland.**

In the *Journal of Botany* for January, 1900, Mr. Harold W. Mornington describes and figures *Sphagnum medium*, Limpr., which he says, "has been frequently gathered and is generally distributed throughout these islands. It has been long known as the purple form of *S. cymbifolium*, the var. *purpurascens* of Russon, but the identity of which with *S. medium* appears to have hitherto escaped notice. The first record seems to be that from Witherslack Moss, Westmoreland, specimens from which, gathered by Barnes in 1872, were issued in Braithwaite's *Sphagn. Brit. Exsicc.* as *S. cymbifolium* var. *purpurascens*, Russ. To Mr. Stabler belongs the credit of first recognizing *S. medium* as a British species, it being included in his 'Hepaticæ and Musci of Westmoreland' (*Naturalist*, 1898, 124)."

In August, 1899, I had the pleasure of a tramp on Foulshaw Moss between Kendal and Morecambe Bay, in Westmoreland, in company with Mr. Stabler and the Rev. C. H. Waddell, when the former pointed out *S. medium* growing among the heather. Foulshaw is a wide peat moss, reminding one very much of the Bog of Allan.

Up to that time I had no knowledge of *S. medium*, and was not aware that a moss which I had gathered on the margin of the Bog of Allan, at Geashill, King's County, in 1890, and had named *S. papillosum* var. *confertum*, was actually *S. medium*, but so Mr. Mornington, who has a portion of my specimen, states in his paper from which I am quoting.

The locality where I gathered *S. medium* is the same as that in which I found *S. Austini*, another very rare moss. Both these plants should be looked for in other places in Ireland, and their discovery ought to incite byologists to search some of our extensive bogs.

S. medium resembles in size, habit, and general appearance *S. cymbifolium*, "but with the tufts *variegated*, dappled with green and red to violet-purple. It varies to some extent in the arrangement of the branch-leaves, but preserves in nearly all cases a facies by which it can be readily detected."

The crucial point which Mr. Mornington describes and illustrates by drawings, is that "the chlorophyllose cells in cross section are small, elliptical, central and completely enclosed on both sides by the biplane hyaline cells," which is not the case in the leaf-structure of any other *Sphagnum*.

To see this requires the use of a $\frac{1}{2}$ -inch and a $\frac{1}{4}$ -inch objective on the microscope, and to make a section of a leaf. Dr. Braithwaite recommends, in making sections of leaves of *Sphagnum*, "to enclose the wet branch in a split vial cork, and tie them tight, then with a razor to make very thin slices of the whole, placing them in a few drops of water on a slide, when they will immediately expand, and the cork may be picked out with a needle." I have often obtained good results by this method. But when I can obtain a turnip—preferably a Swedish turnip—I always use it, because it does not blunt the razor as cork does, and it is equally clean to work with.

I cut a cylinder of turnip to fit tightly into the tube of a simple microtome, in the end I make a cut into which I insert a branch of the *Sphagnum* that is to be sectionized, and keeping it wet, cut with a razor. It is not necessary to make absolutely perfect sections of the *Sphagnum* leaf in order to see the arrangement of the cells; rather thick ones are sufficient. But an essential point in examining them under the microscope is not to put a cover glass on the object, just examine in water and uncovered, any pressure rendering it difficult if not impossible to see the arrangement of the beautifully delicate cells.

Loughbrickland.

H. W. LETT.

ZOOLOGY.

BIRDS.

Bittern near Londonderry.

On 10th January, Mr Daniel Deeney shot a fine specimen of the Bittern (*Botaurus stellaris*, Linn.) at Burnfoot, about five miles from Londonderry. This is another rarity for the Inch district.

Londonderry.

D. C. CAMPBELL.

Grey Phalarope on Lough Foyle.

On 18th September last Mr. Asshur Bond shot a Grey Phalarope (*Phalaropus fulicarius*, Linn.) on the shore of Lough Foyle, near Eglinton.

Londonderry.

D. C. CAMPBELL.

Supposed Reed Warbler In Co. Tipperary.

On reading Mr. Gleeson's description of the Warbler he saw on May 4th (*Irish Nat.*, vol. viii., 1899, pp. 161, 267), it occurs to me to ask him if he is acquainted with the Garden Warbler, which breeds regularly at Castle Lough and elsewhere on the shores of Lough Derg. Its haunt is not however the reedy shores, but the leafy branches and the masses of briars in which it nests. As regards the bright yellow-green birds seen with Tits, it may not be amiss to point out that in September Willow-wrens turn very yellow; but if Mr. Gleeson would send a specimen now and then to Dr. Scharff at the Science and Art Museum, Dublin, he would not only enhance the skin collection, but get his birds identified. The distribution of the Warblers in Ireland is little known, birds of that group being so fond of evading observation, and I shall be indebted to Mr. Gleeson if he can add to the facts stated in my paper on the "Distribution of Birds breeding in Ireland" in the *Irish Naturalist*, 1897, pp. 64-73.

Cappagh, Co. Waterford.

R. J. USSHER.

Pied Wagtails Roosting among Reeds.

On the evening of the 29th November last, about twenty minutes after sunset, I was passing a reedy pool not far from Bray, when I was struck with a continuous rustling among the sedges, from which at first I imagined that some rather large animal was threading his way among them. After watching for several minutes, I found that the sounds proceeded from a number of small dark objects which were moving in titmouse-like fashion on the tops of the faded herbage; these proved to be Pied Wagtails, of which I think fully 150 were congregated in the place. While I watched, small companies of from two to six birds occasionally arrived, and dropped down into the sedge-bed; and on a subsequent evening (December 4) I saw flocks of fifteen and twenty-three arrive and descend in similar fashion. I believe that this assembling for the night and roosting in reed-beds is a habit of the Pied Wagtail, for I have more than once (in winter) disturbed large numbers of these birds after dusk among the reeds by the Royal Canal; but I had never before been able to watch them in the act of collecting and settling themselves for the night. Before going to sleep they exercise themselves clambering about on the tops of the sedges, and this, on still evenings, makes noise enough to attract attention to their presence.

Ballyhyland, Co. Wexford.

C. B. MOFFAT.

MAMMALS.

The Hooded Seal reported from Galway Bay.

In the summer of 1898, I chanced to see a fine specimen of this polygamous and pugnacious seal (*Cystophora cristata*) while it was leaving the shore and making out to sea. A man, who was gathering seaweed, disturbed it while it was basking on shore. He was evidently quite as much frightened at it as it was of him. The inflated hood gave the animal's head quite a human appearance. On seeing it, I proceeded with all possible haste to the spot. By the time I reached the edge of the water it was fully fifteen yards from the shore. I had an admirable view of it. While swimming away to sea, it kept one eye steadily fixed on the shore and on its intruders. The man, who disturbed it, was awe-stricken, and addressing me said—what is it? I informed him that it was a seal. As he seemed incredulous, I explained that it was not a common seal; that it was a rare visitor to the Irish coast. As this man is a frequent visitor to the sea-shore, and has often seen the Common Seal (*Phoca vitulina*), his not having previously seen this sort is testimony that the Hooded Seal is a rare visitor to Galway Bay. Though I have been on the look out for it, and have since seen many seals, I have not again seen the Hooded Seal.

Galway.

R. M. GILMORE.

[The only Irish record of this seal appears to be an early doubtful one from Westport (Thompson, "Nat. Hist. Irel.," vol. iv.). We hope that Mr. Gilmore's further observations may confirm his opinion that this species is indeed a visitor to our shores.—EDS.]



HEADS, WITH SKULLS, OF IRISH CETACEA.

(Greatly Reduced.)

To face p. 83.]

A LIST OF THE IRISH CETACEA.
(WHALES, PORPOISES, AND DOLPHINS).

BY R. F. SCHARFF, PH.D., B.SC.

(PLATES 3 and 4).

WHALES and their allies were formerly a great puzzle to naturalists owing to their fish-like external characters, whereas their internal structure showed close affinity to the higher animals. But everybody knows now that they are not fish. On account of their aquatic mode of existence, they possess a remarkably fish-like form—their front limbs being paddle-shaped, while external hind limbs are entirely absent. In all other respects, however, they agree with the ox, horse, and also with man, and differ from fishes in breathing by means of lungs; in being warm-blooded, and in bringing forth developed young, which are fed with milk during the earlier stages of their existence. Whales, porpoises, and dolphins are, therefore, now classed among the milk-giving vertebrate animals or mammals.

We can distinguish two well-defined groups of these whale-like creatures. The members of the *first group*, comprising a single family (*Balænidæ*), possess no teeth; but the absence of teeth is compensated for by the development of the peculiar elastic substance known as “whalebone.” This whalebone is of a horny nature, and is attached to the roof of the mouth, from which it hangs in the form of a series of long narrow plates, placed transversely to the long axis of the mouth. These constitute a kind of sieve-like wall on each side of the mouth, through which the water is pressed when the whale closes its mouth—thus imprisoning the small creatures which find their way into it

The members of the *second group* are characterised by the presence of teeth, and the consequent absence of whalebone. As far as we are concerned, all the forms belonging to these toothed whales can be classified into two families, viz., the one including the sperm-whale and its allies (*Physcteridæ*), and another to which the porpoises and dolphins belong (*Delphinidæ*).

Owing to the great difficulty of observing these large creatures, the rarity of their capture on our shores, and the meagreness of the descriptions given, we know less about

them than we do of most other groups of Irish animals. In most cases, it is quite impossible from the description obtainable, to decide which species was the one noticed. However, it is certain that no less than fifteen different kinds have been observed off the Irish coast. If those interested in zoology would send me accurate descriptions, measurements, and, if possible, a photograph whenever a specimen of whale is stranded in their neighbourhood, several other species might be added to the list I now give.

Through the kindness of the Director of the British Museum (Natural History), I have been allowed to reproduce some of the figures from the British Museum Catalogue of Mammalia (Part I., Cetacea, 1850), which will assist observers very materially in distinguishing any of the whale tribe stranded on the shore. One of the remaining figures is modified after Van Beneden and Gervais, and another after Bell.

The following five species recorded from English and Scottish waters have not yet been identified on the Irish coast:—*Balænoptera borealis*, *Ziphius cavirostris*, *Monodon monoceros*, *Delphinapterus leucas*, and *Grampus griseus*.

I.—WHALEBONE WHALES.

FAMILY BALÆNIDÆ.

SOUTHERN RIGHT WHALE—*Balæna australis*, Desm.

(Plate 3, fig. 1).

It is almost certain that one of the species of Right Whale has occurred off the Irish coast, but the question whether it was the Southern or the Greenland Right Whale has still to be decided. The probability seems to be in favour of the former species, but the differences between the two are not very striking, so that the illustration given (plate 3, fig. 1, Greenland Right Whale) will stand for both. These large whales may be at once recognised from other Whalebone Whales by the absence of the back fin, the smoothness of the throat, and the very long and valuable whalebone.

Among the many Irish records of whales which might possibly refer to this species, one mentioned by Thompson (XX., p. 56) from the Bay of Enver, Co. Donegal, seems to indicate a Right Whale on account of the special reference to the value of the whalebone, which was computed to be worth from £800 to £900. The average size of these Whales is from 50 to 60 feet long.

HUMP-BACKED WHALE—*Megaptera boöps*, Linn.

(Plate 3, fig. 3).

This whale, apart from its conspicuous hump on the back, is easily distinguished from all others by the enormously long and narrow white flippers. They are about one-fourth the total length of the body, which averages between 40 and 50 feet.

To Mr. Robert Warren, of Ballina, belongs the credit not only of being the first to describe this species from the Irish coast, but also of capturing the whale which came ashore at Enniscrone, Co. Sligo (XXII., p. 119.) It is entirely owing to his speedy efforts that this Hump-backed Whale (immature female) was secured for the Dublin Museum, where the skeleton is preserved. The cranium of a Hump-backed Whale, dredged up in the Irish Sea, is now in the Liverpool Museum.

SIBBALD'S RORQUAL—*Balænoptera Sibbaldi*, Gray.

This is not only the largest whale, but also the largest of all living animals. It agrees with the next two species of whales in the possession of numerous closely-set groovings in the skin of the throat, but differs from them in the colour of the body, which is dark bluish-grey, and in the whalebone being black. The adult reaches a length of from 80-90 feet.

It was first definitely recorded as Irish by Mr. Crouch (XIII., p. 215). This record refers to a specimen which was stranded in March, 1891, in Wexford Harbour, and subsequently sold to the British Museum. A photograph of this whale, which was 82 feet long, is in the Dublin Museum. Further particulars were afterwards supplied by Mr. Barrett-Hamilton (III., p. 306). Although this was the first properly identified Irish specimen of Sibbald's Rorqual, it is highly probable that some of the more indefinite records which we possess, refer to the same species, among them at least three of those mentioned by Thompson, viz. : the whale stranded in December, 1857, in Bantry Bay (XX., p. 57), and those cast up at Castletownsend (p. 58) in 1767, and Glandore in 1844 (p. 59). The length of the first was given as 94 feet, and that of the other two as 85 and 84 feet.

COMMON RORQUAL—*Balænoptera musculus*, F. Cuv.

The Common Rorqual is smaller than the last-mentioned species, being never more than from 60-70 feet in length. The general colour is slate-grey above and white beneath. The whalebone is of a bluish-grey—not deep black as in the last species, and often mottled with white. A skeleton is in the Dublin Museum from Bantry Bay, and several of Thompson's records (XX, p. 56-60) no doubt refer to this species, which is fairly common in the British seas. Some of these records may possibly refer to Rudolphi's Rorqual (*Balænoptera borealis*), but the descriptions are too meagre to identify the latter from them.

LESSER RORQUAL, OR PIKE-WHALE—**Balænoptera rostrata**, Müll.

(Plate 3, fig. 2).

The total length of this species is only from 20 to 30 feet, it being much the smallest of the Rorquals. It is easily recognised, not only by its sharp snout, from which the specific name *rostrata* is derived, but also by the possession of a broad white band which crosses the flippers. With the exception of this band, the upper parts of the body are greyish black, the under parts being white. The whale-bone is yellowish-white.

To judge from the number of records, this species is probably common all round the Irish coast. Thompson's records are too indefinite to be of much value. The first undoubted description of this whale from the Irish coast was given in an important contribution by Carte and Macalister (XII., p. 201), who dissected a young female caught near Drogheda. Two more are mentioned by Mr. Barrett-Hamilton as having been obtained on the coasts of Kerry (IV., p. 75), and Cork (V., p. 27), while the young whale alluded to Mr. Hart (XV., p. 28), which was secured for the Dublin Museum, and which is still in process of maceration, is probably also this species.



II.—TOOTHED WHALES.

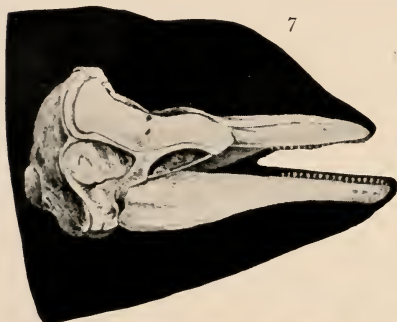
FAMILY PHYSETERIDÆ.

SPERM WHALE OR CACHALOT—**Physeter macrocephalus**, Linn.

(Plate 3, fig. 4).

The Sperm-whale is the largest of the toothed whales. Its enormously large and truncated head—a third the length of the body—distinguishes it at once from all other species. The males of this whale are considerably larger than the females, the former growing to a length of about 60 feet. On our coast the Cachalot can only be regarded as a very rare accidental visitor. Still we possess several records of this species, because it is so easily recognisable.

One of the references dates back to the year 1695, when Dr. Molyneux described three Sperm-whales as having been stranded on the west coast of Ireland (XX., p. 54). Another was taken about the year 1750 at Castlehaven, Co. Cork, and one on the Dublin coast in 1766. The valuable spermaceti contained in the head of this last whale was subsequently refined in Dublin. Mr. Rathborne, of Dublin, has used two Irish Sperm-whales—one from Connemara and one from Cork—in his spermaceti-candle factory within the last seventy or eighty years. Mr. Barrett-Hamilton mentions the capture of a Sperm-whale near Inishkea Island, Co. Mayo, in 1890 (VII., p. 72).



HEADS, WITH SKULLS, OF IRISH CETACEA.

(Greatly Reduced.)

To face p. 87.]

BOTTLE-NOSSED WHALE—*Hyperoodon rostratus*, Gray.

(Plate 3, fig. 5.)

The teeth in this species are reduced to a single pair in the lower jaw and are concealed by the gums. The colour is olive-black above, a little lighter beneath. The skull has a peculiar high crest in the middle, and is subject to great variations as regards sex and age. The Bottle-nosed Whale reaches a length of from 20–30 feet.

This whale was first described as Irish in 1825 by Prof. Jacob, who dissected a specimen stranded at Killiney, Co. Dublin, and presented the skeleton to the Museum of the College of Surgeons in Dublin (XX. p. 47). According to Thompson, several other specimens were seen by Prof. Jacob on the Dublin coast. Another—a male—was cast up at Salterton, Co. Louth, and described by Dr. Bellingham (X. p. 414), and Thompson mentions one obtained in Belfast Bay in the autumn of 1845, the skeleton of which is in the Belfast Museum. Two more are referred to by Mr. Patterson (XIX., p. 194) from the same locality, and he states incidentally that what is known among fishermen as the “herring-hog” is this species. Mr. Barrett-Hamilton gives an account of two from the coast of Wicklow (VI., p. 72). These, which I saw myself, were a male and female. Then there is still another record from Co. Dublin. In September, 1890, a young female was captured at Skerries and conveyed to the Dublin Museum, where its skull is now preserved. A photograph of this specimen, which measured 17 feet, was taken. Mr. Henry B. Rathborne, of Dublin, who used some of these specimens in his factory for the purpose of extracting the oil, informs me that the oil of the Bottle-nosed Whale is good for lubricating, and that this species also contains the valuable spermaceti—a semi-solid oily substance already referred to.

BEAKED WHALE—*Mesoplodon bidens*, Sow.

(Plate 4, fig. 6.)

This is one of our rarest species of whales. It is small—only from 15 to 20 feet long—and according to Mr. Lydekker (XVI., p. 280), the general colour is white above and black beneath, with vermicular white streaks on the flanks. The head is produced into a long beak, and the lower jaws possess a pair of prominent teeth.

Only one of the numerous species of beaked whales visits our shores from the south, and it is surprising that the only two Irish records come to us from the same small bay, viz., that of Brandon, on the Kerry coast. The first Irish specimen was discovered there by Dr. Busteed, of Castle-gregory, in 1864, the second was stranded on the 31st May, 1870. Both these males were described by the late William Andrews (I. and II.)

FAMILY DELPHINIDÆ.PORPOISE—**Phocæna communis**, Less.

(Plate 4, fig. 7).

The Porpoise is one of the members of the second family—the *Delphinidæ*—which are distinguished from the *Physeteridæ* by the possession as a rule of numerous teeth in both jaws. The skull is generally not so elevated behind the nasal aperture in the former family as in the latter. The Porpoise is black above and white beneath, and has a length of from four to five feet. The back fin is triangular, and the teeth are small and numerous.

This small cetacean is common all round the Irish coast. A coloured cast of a full-grown one and also a skeleton are in the Dublin Museum.

KILLER—**Orca gladiator**, Lacép.

(Plate 4, fig. 9).

The Killer is a much larger species than the Porpoise, growing to a length of 20 feet or more. The colour is much like that of the Porpoise, but the Killer has a white spot over each eye, which is absent in the other. The skull is more massive and flattened above, and there are a number of stout, conical teeth in each jaw. The flippers are large, and the back-fin tall and pointed. It is easily recognised by the latter when swimming near the surface of the sea.

Thompson (XX., p. 43) mentions the occurrence of this whale off the north coast of Ireland, and states that a skull from Donaghadee is in the Belfast Museum. In the Dublin Museum there is a skull from Killala Bay, Co. Sligo, given by Captain Dover, in 1871.

CA'IN WHALE OR "BLACK-FISH"—**Globicephalus melas**, Trail.

(Plate 4, fig. 8.)

The name "Black-fish" which is erroneously given by many fishermen to this whale, indicates at least the prevailing colour. It is black all over, except a white patch on the breast. The shape of the head is something like that of the Bottle-nosed Whale, but there is scarcely any nose on this. A thick accumulation of blubber in front of the skull causes a tremendous bulging out of the forehead. The absence of teeth in the skull figured is due to old age. In younger specimens there are a considerable number of small conical teeth in the anterior half of both jaws. The back fin is short, the flippers elongated. The name "Grampus" seems to be indiscriminately applied to the last species and to this, but there is no evidence as yet that the real Grampus (*Grampus griseus*) has occurred in Irish waters. The Ca'in Whale is said to reach a length of 20 feet.

Whether the thirty-eight whales which were driven ashore at the Raven Point outside Wexford Harbour, in July, 1840, belong to this species, as Thompson seems to think (XX., p. 45) is doubtful, but I agree with him in referring the immense shoal—300 in number—which were captured in Bantry Bay in 1844, to the Ca'in Whale. The late Dr. R. Ball observed this species at Youghal, Co. Cork, where it appears to be of frequent occurrence, in June. He stated that they average from 11-18 feet in length, but that one individual had attained to 22 feet. An interesting account of the capture in 1853 of about twenty-five specimens in Dundrum Bay, Co. Down, was given by Dr. Gulliver (XIV., p. 63.) He also dissected a foetus and described its anatomy.

WHITE-BEAKED DOLPHIN—*Lagenorhynchus albirostris*, Gray.

(Plate 4, fig. 10.)

As will be noticed from the figure, this species possesses an indication of a beak, which moreover is brilliantly white. The under parts of the body are also white, the remainder being purplish black. The teeth are very small and numerous. The White-beaked Dolphin is a rare northern species, and grows to a length of 9 feet. A coloured cast of a supposed Bottle-nosed Dolphin from Dublin Bay was identified by Mr. More as belonging to this species (XVII., p. 202). In 1887 Mr. R. Ll. Patterson exhibited a skull of this species before the Belfast Natural History Society, and he afterwards presented it to the Dublin Museum. It was taken at Portavo, on the coast of Co. Down.

WHITE-SIDED DOLPHIN—*Lagenorhynchus acutus*, Gray.

This Dolphin is probably the rarest of all the Irish species of cetacea, and has never been taken on the English coast, though some skulls from the Orkneys and Hebrides are known. It differs from the last principally in colour. The back is black and the under parts white, but there is a drab-coloured band along the flanks, so as to make the colouring rather a striking feature.

Although Mr. Lydekker, in his recent work (XVI.), makes no mention of the occurrence of this species on the Irish coast, it was noticed near Portrush twenty-four years ago by Mr. Ogilby, and duly recorded in the *Zoologist* (XVIII., p. 5007). More recently Mr. Barrett-Hamilton (VIII., p. 384) procured a lower jaw of this Dolphin on the Wexford coast, and presented it to the Dublin Museum.

COMMON DOLPHIN—*Delphinus delphis*, Linn.

(Plate 4, fig. 11.)

The typical Dolphins, to which this species belongs, differ from the last in having a much more pronounced beak. The Common Dolphin has from 40-60 pairs of small, conical teeth in each jaw, the skull being very flat above. According to Mr. Beddard (IX., p. 255) the colours of this dolphin are unusually variegated for a cetacean, and liable to much variation. "The usual black of the dorsal and white of the ventral surface are supplemented by two lateral areas of a fulvous or greyish tinge; a

black or greenish band extends from the lower jaw to the base of the pectoral fin; there is a ring of black round the eye; one or two bands of greyish or greenish traverse the light colour of the lower part of the sides."

This species, common in the Mediterranean, is much rarer with us, though it probably occurs in small numbers all round the coast.

BOTTLE-NOSED DOLPHIN—*Tursiops tursio*, O. Fab.

(Plate 4, fig. 12).

The accompanying figure of the skull of this Dolphin gives but a poor idea of its structure. It was copied from Bell (XI., p. 469), no better figure being available. The shape of the head somewhat resembles that of the Bottle-nosed Whale, but it differs of course in size and in the possession of a large number of teeth. The teeth are stouter in this than in the Common Dolphin. It is black above, gradually shading into white beneath, and from 8 to 12 feet long.

The specimens referred to by Thompson (XX., p. 41) are probably not this species. At any rate the one from Dublin Bay determined by Dr. R. Ball as the Bottle-nosed Dolphin, of which he had a cast made, was subsequently shown by More (XVII., p. 292) to be *Lagenorhynchus albirostris*. The only Irish specimen therefore of which we can be certain is that mentioned by Bell (XI., p. 468) as having been taken in 1829 on the south coast of Ireland. This was subsequently figured by Gray in the "Zoology of the Erebus and Terror."

DESCRIPTION OF PLATES.

Skulls of Cetacea with outlines of heads in black.

PLATE 3.

- Fig. 1. Right Whale (*Balæna mysticetus*, Linn.)
- Fig. 2. Lesser Rorqual (*Balenoptera rostrata*, Müll.)
- Fig. 3. Hump-backed Whale (*Megaptera boöps*, Linn.)
- Fig. 4. Sperm-whale (*Physeter macrocephalus*, Linn.)
- Fig. 5. Bottle-nosed Whale (*Hyperoodon rostratus*, Gray.)

PLATE 4.

- Fig. 6. Beaked Whale (*Mesoplodon bidens*, Low.)
- Fig. 7. Porpoise (*Phocæna communis*, Less.)
- Fig. 8. Ca'ing Whale (*Globicephalus melas*, Trail.)
- Fig. 9. Killer (*Orca gladiator*, Lacep.)
- Fig. 10. White-beaked Dolphin (*Lagenorhynchus albirostris*, Gray.)
- Fig. 11. Common Dolphin (*Delphinus delphis*, Linn.)
- Fig. 12. Bottle-nosed Dolphin (*Tursiops tursio*, O. Fab.)

All figures are greatly reduced, and not to the same scale.

Figs. 1, 2, 4, 5, 6, 7, 8, 9, 10, 11 are from Brit. Mus. Catalogue of Mammalia, Part I; fig. 3 after Van Beneden and Gervais (Monographie des Cetacés); fig. 12 after Bell (British Quadrupeds.)

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Science and Art Museum, Dublin.

DISTRIBUTION OF THE *ALCHEMILLA VULGARIS* GROUP IN IRELAND.

BY EDWARD F. LINTON, M.A.

FIVE years ago I began to collect notes to show the distribution of the forms of *Alchemilla vulgaris* in Ireland, at a time when I had recently learned from M. Buser to distinguish them, and published a short paper in the *Journal of Botany* (1895, 110), with descriptions and the distribution in Great Britain. Since then Mr. R. Ll. Praeger has sent me a large number of specimens of this group of plants, to criticize or name, from many parts of Ireland; and he has kindly permitted me to incorporate the results of his observations with the notes I have gathered from other sources for the purposes of this paper. I have also to thank Mr. S. A. Stewart for sending me a few specimens.

In the following account I have numbered the counties and vice-counties in accordance with the scheme set forth by Mr. Praeger in his paper on the Botanical Subdivision of Ireland in the *Irish Naturalist* and *Journal of Botany* for February, 1896.

A. vulgaris, L., *sensu restricto*; *A. pratensis*, Schmidt.

9. Clare.—Hb. R. P. Murray.
22. Meath.—Near Oldcastle, R. Ll. Praeger.
23. Westmeath.—H. C. Levinge; R. Ll. Praeger.
24. Longford.—R. Ll. Praeger.
25. Roscommon.—By Lough Key, R. Ll. Praeger.
29. Leitrim.—R. Ll. Praeger.
30. Cavan.—Near Lough Sheelin, R. Ll. Praeger.
33. Fermanagh.—R. Ll. Praeger.
36. Tyrone.—R. Ll. Praeger; and Cookstown, Miss M. C. Knowles.
38. Down.—Near Holywood, R. Ll. Praeger.
39. Antrim.—Rev. S. A. Brennan; near Belfast, S. A. Stewart; Dunloy, and White Park Bay, R. Ll. Praeger.

A. alpestris, Schmidt. *A. vulgaris*, L., var. *glabra*, Mert and Koch, 1823 (non DC., 1805).

10. North Tipperary.—R. Ll. Praeger.
16. West Galway.—Near Recess, R. Ll. Praeger.
27. West Mayo.—Near Castlebar, E. S. Marshall.
28. Sligo.—Keishcorran, and another locality, R. Ll. Praeger.
29. Leitrim.—R. Ll. Praeger.
33. Fermanagh.—At Carrickreagh by Lough Erne, R. Ll. Praeger.

- 35. North Donegal.—By Lough Salt, hb. British Museum.
- 36. Tyrone.—Near Omagh, Miss M. C. Knowles.
- 39. Antrim.—Hb. Science and Art Museum, Dublin; near Belfast, R. P. Murray; Dunseverick, R. Ll. Praeger; Squires Hill, near Belfast, S. A. Stewart.

A. filicaulis, Buser (*Bull. de l'Herb. Boissier*, i., app. 2, p. 22, 1893).

- 1 or 2. Kerry.—Hb. British Museum.
- 5. East Cork.—Hb. Science and Art Museum, Dublin; hb. British Museum; in both cases from Fermoy.
- 6. Waterford.—Cappoquin, R. Ll. Praeger; also hb. Science and Art Museum, Dublin, from Kilmacow.
- 7. South Tipperary.—Fethard, R. Ll. Praeger.
- 10. North Tipperary.—R. Ll. Praeger.
- 11. Kilkenny.—Ballyragget, R. Ll. Praeger.
- 13. Carlow.—R. Ll. Praeger.
- 14. Queen's County.—Grantstown and base of Arderin, R. Ll. Praeger.
- 15. S.E. Galway.—About Woodford, R. Ll. Praeger.
- 16. West Galway.—Recorded from Clonbur (*Journ. Bot.*, 1896, 254), E. S. Marshall; Moycullen and Kilbeg, R. Ll. Praeger.
- 17. N.E. Galway.—R. Ll. Praeger.
- 18. King's County.—R. Ll. Praeger.
- 19. Kildare.—R. Ll. Praeger.
- 21. Dublin.—R. Ll. Praeger.
- 23. Westmeath.—By Lough Derevaragh, &c., R. Ll. Praeger.
- 24. Longford.—R. Ll. Praeger.
- 25. Roscommon.—Mote Park, &c., R. Ll. Praeger.
- 29. Leitrim.—R. Ll. Praeger.
- 31. Louth.—Near Kearney's Cross, R. Ll. Praeger.
- 36. Tyrone.—Near Omagh, Miss M. C. Knowles.
- 37. Armagh.—Near Tynan Abbey, S. A. Stewart.
- 39. Antrim.—On Cave Hill, Belfast, S. A. Stewart; Knockagh, R. Ll. Praeger.
- 40. Derry.—*Fide* S. A. Stewart.

Excepting this last, and the two contributed by the Rev. E. S. Marshall, specimens from all these localities have passed through my hands; and I am well assured these three exceptions were also rightly named. It is a little remarkable that *A. filicaulis*, Buser, should be twice as well distributed as either of the other two. In England and Scotland, the type is nearly as widely distributed; but *A. alpestris*, Schmidt, being seldom found except in subalpine situations, is naturally more restricted.

Bournemouth.

A NEW WATER MITE FROM ULSTER.

BY J. N. HALBERT.

[Read before the Dublin Naturalists' Field Club, March 13th, 1900.]

DURING the summer and autumn of last year Mr. W. F. de V. Kane very kindly sent to the Museum several small collections of water mites, captured while dredging for Entomostraca in various localities in the North of Ireland. One of these gatherings, made towards the end of September in Upper Lough Erne, contained several rarities, among the rest a most interesting *Arrenurus*, in structure quite unlike any of the previously-known British species. This specimen was subsequently lost. About a month later Mr. Kane very fortunately succeeded in capturing both sexes of what is without doubt the same species in a lake in the County of Monaghan, and from these specimens the following notes have been made.

The newly-discovered mite is of considerable interest, as the only known form at all resembling it in structure is a Swedish species, *Arrenurus nobilis*, described by Neuman¹ in 1880.

A careful comparison of the Irish mite with the description and figures of *A. nobilis* shows that, although they are evidently closely allied forms, they cannot be united under the one specific name, and in this opinion I am supported by Dr. R. Piersig, of Annaberg, to whom drawings have been submitted. It may be worth noting that Neuman's species has apparently not been detected by recent workers, and no trace of his unique example is now to be found amongst the remnants of his collection preserved in the Gotenburg Museum.²

The species of *Arrenurus* are amongst the most beautiful of the *Hydrachnidæ*. They are remarkable for the hard skin, which is always more or less coarsely granulated, and the great specialization in structure attained by the males. The species are comparatively numerous, and are as a rule very brightly coloured. The species has been named after its discoverer, who has been instrumental in bringing to light many rare forms from our northern lakes

¹ "Om Sveriges Hydrachnider," *Kongl. Svensk. Vet. Akad. Handl.*, xvii., No. 3.

² *Zoolog. Anzeiger*, xx., 1897, p. 333.

Arrenurus Kanel, sp. nov.

MALE (Figs. 1, 2, 3).—Length, including appendage, 1·2 mm., breadth, 0·88 mm. Colour yellow, tinged in places with green and with reddish-brown blotches. Legs and epimera pale green. Body oval, very gradually narrowed in its posterior half, thence *suddenly contracted and produced into a well-defined appendage* (length 0·22 mm., breadth at base 0·32 mm.) The “impressed line” encloses a *considerable portion* of the dorsal surface, is widely rounded in front, bent outwards in the middle, and terminates on the side of the appendage. On the back is a double row of circular depressions, and near these, springing from small papillæ, are a few long hairs. The body of the animal, as well as being coarsely granulated, shows a very distinct longitudinal striation. The posterior end of the main appendage is furnished on each side with several pairs of hairs, the arrangement of

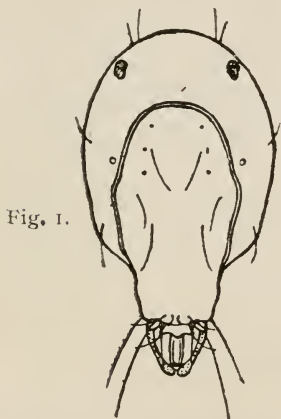


Fig. 1.



Fig. 2.

Fig. 1, *Arrenurus Kanel*, sp. nov., Male, dorsal view without legs or palps. Fig. 2, Male, lateral view. Magnified.

which can be best seen in Figure 1. The male genitalia are remarkably complex, from the end of the main appendage projects a trilobed transparent appendage¹ (length 0·04 mm.)—the “hyalines häutchen” of German writers—close to this on each side is a *small outwardly-curved horn*. Below the processes just described lies the comparatively long petiolus (length 0·18 mm.) which is cylindrical, somewhat widened about the middle, and bent upwards at the apex. This is again enclosed by two transparent club-shaped organs, which meet just beyond and beneath the free end of the petiolus. As in the case of the latter these spring from the ventral surface of the main appendage. Epimeral plates very large, together with the genital area occupying most of the under side of the body. The legs and palpi are of the normal type, the former being rather long and robust, the fourth segment of the last pair carrying a curved spur at the apex.

¹ In the Lough Erne specimen this appendage is decidedly longer than in the Monaghan example.

FEMALE (Fig 4).—Length 1·4 mm., greatest breadth 1·08 mm. The body is strongly narrowed in front, “impressed line” enclosing most of the dorsal surface; as in the male there is a double row of depressions down the middle of the back, and the body is striated. Epimeral plates very much smaller than in the male; close to the last pair lies the genital area. In general shape the female of this mite is not unlike that of *A. albator*, Müller.

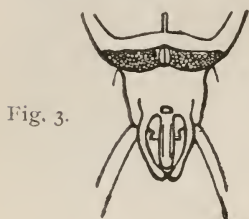


Fig. 3.



Fig. 4.

Fig. 3, *Arrenurus Kanei*, sp. nov., Male, ventral view of hinder region.

Fig. 4, Female, ventral view. Magnified.

LOCALITIES.—Upper Lough Erne, September 20th, 1899 (one male); Dartrey Lough, in the County of Monaghan, October, 1899 (one ♂ and three ♀♀). Type specimens now in the Dublin Museum.

Science and Art Museum, Dublin.

AN IRISH GEOGRAPHY.

Elementary Geography for Irish Schools. By JOHN COOKE, M.A. (Dubl.). London: John Murray, 1899; pp. i.-x. and 1-114.

This work is one of the many signs of the changes that may be expected in Irish education. It is an attempt to interest the elementary pupil from the outset in the country in which he lives, and to employ its natural features as illustrations of those prominent throughout the globe. Such an ideal could not be reached in countries of more uniform structure, Holland, for example; but Ireland fortunately lends itself on all sides picturesquely to the purpose. The introduction, on general principles of Geography, gives us a view and plan of Londonderry for comparison; and similar treatment of Glendalough, in Co. Wicklow, illustrates the forms of mountain-sides and valleys. Some of the Irish illustrations, prettily reduced from photographs, are given without names, which seems a break in the general plan of the volume; and surely by inadvertence, a false impression is conveyed when it is stated in the preface that “all the plans, maps, and illustrations have been specially prepared for this book.” This is true of the mechanical process-blocks; but they are made in great part from the photographs

issued by Mr. Welch for the North of Ireland, and by Mr. Lawrence for the South. Mr. Welch comes off rather badly, for his fine peak above Doo Lough, in Co. Mayo, on p. 24, receives no title at all, while his Slieve Bearnagh, in the Mourne Mountains (p. 25), is ascribed to a mountain-range in "Co. Antrim," where mountain-ranges are conspicuously absent. Mr. Lawrence's Bridge of Lismore, on p. 32, is said to be in Co. Cork. Mr. Cooke knows Ireland so intimately, that these details must be held to show signs of haste in the serious task of preparing a "first-book of science."

The maps are in duplicate, one series being photographed from raised models without place-names; the other maps contain the names of countries on a uniform red ground, as a sort of key to the valuable physical map that precedes each throughout the volume. The treatment of the principal features of the globe (pp. 38-74) is on the old-fashioned lines of treating the rivers apart from the mountains, the capes apart from the islands, and so on. Thus, on p. 65, the Balkan Peninsula, Corea, Labrador, Alaska—why is Alaska a peninsula?—and Yucatan occur together, of course with others, as a list of the "peninsulas of the world." We have no doubt that some current curriculum hampers the author, and brings down his admirable ideals into these regulation grooves.

Ireland, however, occupies pp. 75-114, and is written for the most part graphically, and with the enjoyment born of personal knowledge. No attempt is made to correlate or explain the various features; and probably this is left for lessons in Physical Geography. It is impossible, of course, to "explain everything," like the mother of Lady Windermere; but a word in season would, at any rate, check the spread of some romantic fallacies, such as those, for example, which gather round the Giants' Causeway. This object is, by-the-by, stated on p. 80 to be 400 feet high. We note also, on p. 86, that an explanation is put forward as to the petrifying properties of the waters of Lough Neagh. The petrified wood in question, however, is silicified, and is washed out from the Cainozoic plant-beds; its occurrence has, we believe, nothing to do with the modern waters of the lake, despite two centuries of tradition.

We seem to be pointing out flaws in this pleasant and original little book; but they are mainly such as result from the limitations imposed upon the author. A work on the same lines for secondary schools, connecting the structure and surface-features of Ireland with the adjacent island of Great Britain, and thence in a broad way with continental Europe, may, perhaps, follow from the same pen, and would carry out the promise that cannot be perfectly fulfilled in these 114 excellently printed pages.

G. A. J. C.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of Black-headed Gulls from Dr. C. J. Patten, a Monkey from Mr. T. Broome, and a Barn Owl from Mr. A. Thomson. 3,646 persons visited the Gardens in February.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 18.—The Club met at Leinster House, Mr. GREENWOOD PIM in the chair. It was announced that Mr. Andrews wished to resign the presidency of the Club, and Mr. Pim was unanimously elected to the vacant office. Dr. J. A. Scott was appointed Vice-President, Mr. F. W. Moore, Hon. Secretary, and Mr. W. N. Allen, Hon. Treasurer. Some proposed alterations in the rules were discussed, and a decision thereon postponed until the next meeting.

Prof. T. JOHNSON exhibited a preparation of a sclerotium of the fungus *Sclerotinia sclerotiorum*, taken from a diseased Jerusalem artichoke, grown at Greystones, from "seed" imported from England two years in succession and each year increasingly diseased. The disease is due to the same fungus as that which helps to cause the yellow-blight in potato-plants in the west and other parts of Ireland. The material was received from Miss Hughes.

Mr. HENRY J. SEYMOUR showed photo-micrographs of rock-sections, and also a thin section of a peculiar silicified limestone from Slane, Co. Meath. This rock was originally a fossiliferous and oolitic limestone of Carboniferous age, and contained some minute quartz-granules. Subsequently the carbonate was almost entirely dissolved away and replaced by secondary silica, which has grown in optical continuity around the original quartz-granules as a nucleus. The result has been the formation of a mesh-work of interlacing acicular crystals of quartz, many of which are bi-pyramidal. So gradual has been the replacement of the calcium carbonate, that the concentric rings of the "oolite" are perfectly preserved as pseudomorphs in silica, and may be seen passing through as many as five or six independent quartz crystals.

Mr. J. N. HALBERT exhibited living examples of the "Mud Mite," *Limnochares holosericea*, Lat. In its structure and habits this species forms a connecting link between the true water mites (*Hydrachnida*) and the land mites (*Trombidium*, &c.). Only the one species is known, which is not uncommon at the bottom of pools and semi-stagnant water in the neighbourhood of Dublin.

FEBRUARY 15.—The Club met at Leinster House.

Mr. GREENWOOD PIM, President, showed a very curious mould, *Botrytis dichotoma*. The specimen which had been in his possession since 1874 was mounted dry, and was in perfect preservation. It consisted of rather thick hyphæ, branched dichotomously, and covered with spherical spores, each supported on a short pedicel, resembling very short, round-headed pins. It occurred on a decaying stem in Mr. Pim's garden, and does not seem to have been found in the British Isles either before or

since, as by an oversight it is not included in Mr. Massee's book, and it seemed quite unknown to the members of the British Mycological Association to whom it was exhibited in 1898. It agrees exactly with Corda's figure (*Icones Fungorum*).

Mr. M'ARDLE exhibited *Lepidozia setacea*, Web., var. *sertularioides*, Huben., which he found on a damp bank at Lough Adoon, Co. Kerry, in September, 1897. From the type it differs in the much elongated stem, longer leaves more distantly placed and of a paler colour. The name was given to this curious form by Hubener, on account of the resemblance it bears to one of the plant-like Hydroids. It is an addition to the cryptogamic flora of Ireland. It is known to occur in Germany and North America.

Mr. H. J. SEYMOUR exhibited a photo-micrographic apparatus designed and made by him, and adapted especially for use with low magnifying powers such as are wanted in photographing rock-sections, for which purpose it has been found by him to give excellent results. It consists of a heavy base of wood about three feet by nine inches, and two and a half inches thick. On this two platforms carrying a microscope and a camera respectively slide between grooved runners. An incandescent mantle gas-lamp furnishes the illuminating power, the light being condensed by a small lens on to the micro-slide. A novel feature is an extremely simple arrangement for focussing, carried out by a suitable combination of brass rods and binding screws and clamps, such as are used for making electrical connections. The apparatus was shown in working order and explained by the exhibitor.

Mr. F. M. SELLENS showed a preparation of the common moss *Funaria hygrometrica*.

MARCH 1.—The Club met at Leinster House.

Mr. GREENWOOD PIM (President), showed a specimen of *Marasmius Hudsoni*, which was mounted in glycerine, and had been in his possession since 1875. This is a minute agaric, not uncommon on dead holly leaves; the pileus not exceeding in size the head of an entomological pin, and beset with long stiff bristles.

Mr. M'ARDLE exhibited *Scapania planifolia*, Hook., which was collected on a rocky ledge at 1,500 feet, at Moidart, in Scotland, by Mr. M'Vicar, in 1898. Sir William Hooker, in his "British Jungermaniæ," reports the plant to have been found by Dr. Taylor on the summit of Mount Brandon, Co. Kerry, in 1813. Its rediscovery in Ireland would be of botanical importance. It differs from all other *Scapaniæ* in the beautiful cell-structure and the dentato-ciliate margins of the leaves, which are in two rows; the upper, or smaller row, which represent the lobule in other *Scapaniæ*, is quite separate in *S. planifolia* from the large row of leaves on the underside of the stem; in this way it bears considerable resemblance to some genera of mosses, as *Hookeria*, *Hypopterygium*, &c.

Mr. H. SEYMOUR showed a simple method of drawing micro-slides by means of a grating formed of a series of intersecting parallel sets of fine lines. The method of making the grating, which consisted of a circular disc of cardboard, the lines being single fibres of silk, was demonstrated.

The grating is dropped on to the eye-piece diaphragm, the field of view being thus divided up into distinct areas. The sheet of paper on which the drawing is to be made is divided up into areas corresponding to those of the grating, and each sub-division then filled in by eye.

Mr. F. M. SELLENS showed preparations of the diatom, *Arachnoidiscus ornatus*, and of the fossil protozoan *Campilodiscus clypeus*.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

FEBRUARY 6.—A meeting was held in the Museum, when a paper was read by Mr. CONWAY SCOTT—subject, "Some Thoughts on Rome." Afterwards Mr. W. H. Patterson, M.R.I.A., described the "Growth of the Ink Blot," with illustrations.

MARCH 6.—A meeting was held in the Museum, when a paper was read by WILLIAM GRAY, Esq., C.E., M.R.I.A. Subject—"The Position of Belfast in relation to Technical Instruction under the Agricultural and Technical Instruction Act." A discussion followed, in which several members of the City Council, School of Art, Technical School, Queen's College, etc., took part.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 16.—Mr. WILLIAM SWANSTON, F.G.S., presiding, Mr. F. J. BIGGER exhibited and described a series of "plateau" implements lent by Mr. R. D. Darbishire, of Manchester. These were collected by Mr. Harrison in high-level gravels in the Darent Valley, Sevenoaks, Kent. Mr. Gray described the relation of these plateau worked flints to the worked flints of Antrim.

Mr. W. J. FENNELL, M.R.I.A.I., read a paper on the Island of Iniscleraun, in Lough Ree, and the great ecclesiastical establishment which at one time flourished there. The paper was illustrated by limelight views of plans, drawings, and photographs, and rubbings from the old incised crosses, from views, sketches, and careful measurements made on the spot by Mr. Fennell.

Mr. F. J. BIGGER, M.R.I.A., vice-president, read a paper on "A Half-hour in the Garden," and stated that a garden should be a garden all the year round, for, as Bacon says in his essay on "Gardening," "I doe hold it in the royall ordering of gardens there ought to be gardens for all the moneths in the years, in which severally things of beautie may be then in season."

The paper was exhaustively illustrated by a series of plant slides, taken by Mr. F. C. Bigger during the past summer in the garden at Ardrie. Each slide was fully described, and the botanical details pointed out. The water-lilies (*Nymphaea alba*) and the tall *Typha latifolia* were particularly admired; also the different grasses, the Bullrushes (*Scirpus lacustris*), and the Great Water-dock (*Rumex Hydrolapathum*). After a very animated discussion, the meeting was closed by the election of several new members.

JANUARY 20.—BOTANICAL SECTION.—The first portion of Cyperaceæ, the spike-rushes and their allies, was discussed.

FEBRUARY 16.—Rev. C. H. WADDELL, B.D., presiding. A collection of shell ornaments from Torres Straits and New Guinea were sent for exhibition by Professor Haddon, F.R.S., and illustrations of their practical use were thrown on the screen.

Mr. R. LLOYD PRAEGER, B.E., M.R.I.A., delivered a lecture on the result of his botanical excursions over the centre and west of Ireland, illustrated by limelight views on the screen. The lecturer said that, owing to its position as the most westerly portion of the Continent of Europe, Ireland was of peculiar interest to the student of botanical and zoological geography. Here, on the extreme edge of the Continent, we might expect to find vestiges of the plants and animals that had gone before, pushed out to the very verge of the ocean by stronger species spreading from the great Eurasian land area. The present distribution of plants in Ireland was profoundly influenced by soils, and, according as the prevailing rocks were limestone or non-calcareous, a large number of species were often present in or absent from a district. Ireland could be divided into several botanical districts, the features of which he would next describe. The natural botanical districts were then described, and illustrated by means of lantern slides and specimens of plants. Turning now to the subject of botanical research in Ireland, a brief sketch was given of the history of Irish botany, from the time when Caleb Threlkeld compiled the first Irish flora in 1726 down to the present day. The most recent work, the second edition of *Cybele Hibernica*, divided the country into twelve districts, and showed the distribution of each plant according to this scheme. A much more accurate knowledge of plant distribution was, however, requisite for the purposes of the photogeographer. Maps were shown illustrating how H. C. Watson had sub-divided England, Scotland, and Wales into 112 divisions, and how, on similar lines, the lecturer had sub-divided Ireland into forty divisions. What was wanted then to render our knowledge of Irish plant distribution complete was full lists of the plants growing in each of these forty divisions. To this task the writer had applied himself four years ago, and he gave details regarding the progress of the work, which was now approaching completion. During the discussion that followed, it was suggested that the county borough council should be asked to restore and complete the botanical collection that formerly existed in what is now known as the Botanic Park, and also to provide an aquarium, both objects being of great value from a technical education point of view, and, with the assistance of the members of the Club, could be established and maintained at very little cost.

BOTANICAL SECTION. FEBRUARY 17.—Mr. PRAEGER read a paper on "Plants of the Ulster Borderland." He said that he proposed to exhibit specimens of a number of more or less common Irish plants, which in their northward range either stopped short on the borders of Ulster or were very sparingly distributed in that province, and his remarks would have special reference to the North-east. Some of these plants might still be extended to Ulster, and of others new stations were probably

awaiting discovery. He then showed and described the characters and distribution of plants which he grouped as follows:—Plants of lakes and ditches—*Ranunculus circinatus*, *Myriophyllum verticillatum*, *Potamogeton plantagineus*. Plants of marshes and bogs—*Stellaria glauca*, *Galium uliginosum*, *Juncus obtusiflorus*, *Lastrea spinulosa*. Plants of pastures and baulks—*Hypericum dubium*, *Trifolium filiforme*, *Leontodon hirtus*, and *L. hispidus*, *Primula veris*, *Gentiana Amarella*, *Orchis Morio*, *O. pyramidalis*. Plants of dry places—*Poterium Sanguisorba*, *Dipsacus sylvestris*, *Erigeron acre*, *Carlina vulgaris*, *Festuca rigida*. Plants of the sea-shore—*Trifolium fragiferum*, *Crithmum maritimum*, *Atriplex portulacoides*. Alien plants spreading in Ireland—*Diplotaxis muralis*, *Senebiera didyma*, *Arenaria tenuifolia*, *Valerianella Auricula*, *Matricaria discoidea*, *Crepis taraxacifolia*, *Linaria minor*, *Orobanche minor*.

DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 12.—Professor A. C. Haddon in the chair. About forty members and visitors were present.

Mr. W. A. CUNNINGTON read a paper on "The Crabs of our Sea-shores," which will shortly appear in the pages of this magazine.

Professor A. C. Haddon, Mr. W. F. de V. Kane, and Dr. N. H. Alcock spoke on the subject of the paper.

Mr. J. N. Laird and Mr. J. S. Joly were elected members of the Club, and three candidates nominated for election.

Nomination of officers and committee for 1900 were made. The following resolution was adopted—"That this meeting will cordially support the committee in carrying out the provisions of Rule 13."

JANUARY 30.—ANNUAL MEETING.—The outgoing President, Mr. R. L. PRAEGER in the chair. Thirty-one members and visitors were present. The minutes of the previous meeting were read and signed. The officers and committee nominated at the last meeting were declared elected, no other candidates having been nominated. Mr. GREENWOOD PIM then took the chair. Votes of thanks were passed to the outgoing President, Vice-president, and Secretary, and to the Royal Irish Academy for the use of their rooms.

The Report for 1899 was read and adopted. The following is an abstract:—

Your Committee begs to submit herewith its fourteenth Annual Report. At the beginning of the year the Club numbered 191; at the beginning of 1900 the membership stands at 177, 9 new members having been elected, and 23 names removed from the list, owing to resignation of members or other causes.

The Winter Business Meetings, seven in number, have been well attended, the average attendance being much as in previous years.

As usual the papers were fully illustrated by specimens, microscopic preparations, and lantern slides.

The Winter Session opened with a *Conversazione* held on October 25th, attended by 220 members and visitors, including representatives of the Belfast, Limerick, and Cork Field Clubs.

Much useful work has been carried on in connection with the Excursions. Your Committee has still to regret, however, that more members, with leisure, do not take a more active part in the prosecution of some special branch of natural history. The interchange of lecturers between the Irish Clubs has been continued. Your Committee proposes to act, during the year 1900, on their powers under Rule XIII., viz. :—to offer prizes for competition for collections of scientific objects of the district, &c.

The proceedings at both the Summer and Winter meetings of the Club continue to be reported in the pages of the *Irish Naturalist*. The Committee would again urge on members the necessity of supporting this Irish Natural History magazine, by subscribing to it regularly. The Committee recommends that the grant to the Editors to defray cost of publication during the year 1899 be £15. The best thanks of the Committee are due, and are hereby tendered, to the Council of the Royal Irish Academy for again granting to the Club the privilege of meeting in their house during the year.

The Treasurer's report was not before the meeting in consequence of the illness of the Treasurer, Mr. H. Gore Cuthbert.

Mr. PIM then brought forward a communication on "Notes on the Application of Photography to Natural History." The communication was highly interesting and instructive, being profusely illustrated with lantern slides, many of which were beautifully coloured by Mr. PIM. Dr. C. J. PATTEN and Mr. SEYMOUR spoke on the subject, and congratulated the President on his paper.

Messrs. J. A. Valentine, W. J. De C. Wheeler, and R. J. Fleming were elected members of the Club, and two candidates nominated.

FEBRUARY 20.—The President (Mr. GREENWOOD PIM, M.A.) in the chair. Thirty-five members and visitors were present. After the signing of the minutes of the last meeting the report of the Treasurer for 1899 was adopted on the motion of Mr. H. J. SEYMOUR, seconded by Mr. W. de V. KANE.

Dr. N. H. ALCOCK (Hon. Sec.) announced that the Committee offers prizes of £1 each for the best collections in any of the following groups made during the present year :—

Flowering Plants. Mosses and Hepaticæ. Lichens. Algæ. Fishes. Land and Freshwater Molluscs. Crustacea. Coleoptera. Hymenoptera or Diptera. Marine Worms. Pleistocene Fossils. Igneous Rocks.

The following Special Prizes are also offered by private members :—

The President, Mr. GREENWOOD PIM, offers a prize of £1 for the best set of four lantern slides illustrative of any department of natural history (including photomicrographs). Mr. R. LLOYD PRÆGER offers a special prize of £1 for the best list of records of flowering plants from any part of Ireland, additional to those already collected for the purposes of an Irish "Topographical Botany." Mr. H. J. SEYMOUR offers a prize of the value of 10s. for the best collection of microscopical minerals obtained from sea-sands, river-gravels, or decomposed rocks in Ireland, with a view to encourage the study of Irish mineralogy. Conditions and particulars may be obtained from the Secretaries of the Club.

Mr. H. J. SEYMOUR read a short paper giving details as to the methods to be followed by members of the Club who may compete for the special prize which he has offered for "the best collection of microscopical minerals obtained from sea-sands, river-gravels, or decomposed rocks in Ireland." By means of a series of lantern slides he showed the best types of localities for collecting material, the apparatus necessary, and the method of working to be adopted. Drawings and lantern slides of some of the rarer minerals found by him in sands were also exhibited.

The President, Dr. Foord, Dr. C. J. Patten, and Dr. Alcock discussed the paper.

Dr. C. J. PATTEN (Hon. Sec.) brought on a communication on (a) The Pigeons native to Ireland; (b) *Machetes pugnax*; (c) *Tringa arenaria*.

The general characters of the pigeon family were first indicated, after which the different native species were dealt with, and distinguished by the aid of mounted skins and series of lantern slides. Among the rare forms may be mentioned Stock Dove, Turtle Dove, and Passenger Pigeon. The last has only once been recorded from Ireland. The geographical distribution of pigeons was referred to, also the descent of the many varieties of domestic pigeons from one ancestral stock, the Rock Dove. Note was also taken of the history of pigeons—their domestication being traceable as far back as the 5th Egyptian dynasty in 3000 B.C.

The general characters of the Ruff were next described, together with the remarkable variation in size, according to sex. The plumage of the male and female also differs very much in the breeding season. Lantern slides, illustrating these remarks, and also the pugnacious habits of the Ruff, were exhibited. Their occurrences about Dublin Bay as autumn migrants were noted.

The diminution and increase in numbers of the Sanderling in Dublin Bay at different times of year and their change of plumage were also mentioned. The paper was fully illustrated with lantern slides and stuffed specimens. Messrs. W. F. de V. Kane, J. E. Palmer, and Dr. Alcock spoke on the paper.

Mrs. D. R. Alcock and Mr. A. L. Otway were elected members of the Club, and two candidates for membership were nominated.

MARCH 13.—The chair was taken by Mr. R. LL. PRAEGER in the absence of the President. Thirty-nine members and visitors were present. The minutes of the previous meeting were read and signed.

Mr. J. N. HALBERT read a paper on "A New Water-mite from the North of Ireland," which appears *in extenso* in the present number.

Dr. Patten and Mr. Seymour spoke on the paper.

Mr. R. LL. PRAEGER read a paper on "Notes on Botanical Exploration in 1899." His remarks were illustrated by a collection of dried plants. This communication will shortly appear in the *Irish Naturalist*. The paper was discussed by Mr. Seymour, Mr. Ellison, and Dr. Patten.

Dr. C. J. PATTEN (Hon. Sec.) read a short paper on the Grey Phalarope (*Phalaropus fulicarius*), which will be published in a subsequent number. Mr. Halbert and Mr. Ellison spoke on the paper.

Mr. W. J. D'C. WHEELER exhibited portion of the cranium of a Bear found fifteen years ago in a cave in Sligo. He gave a short account of the history of its discovery originally, and the manner in which it came into his possession. Mr. Wheeler pointed out peculiar markings on the side of the skull, due to the washing of small stones over the exposed surface for a considerable time. The question of species was gone into, and it is supposed that the remains of Irish Bears had an ancestral stock from *Ursus ferax* (Grisly Bear).

Mr. Wheeler quoted the writings of many able authorities, including the late Dr. Valentine Ball, Dr. Carte, Mr. W. Thompson, and Mr. Wilde. Mr. Prueger spoke on the paper, and congratulated Mr. Wheeler on his interesting communication.

The Rev. W. F. A. Ellison, Victor E. Smith, and S. H. Pethebridge, were elected members of the Club, and three candidates were nominated for membership.

NOTES.

BOTANY.

PHANEROGAMS.

Stachys Betonica, Benth., in Co. Armagh.

It may be of interest to note that I saw this plant growing last summer in North Armagh. I do not give the exact locality, as there seems to be a danger of its becoming extinct. It was *not* on the old rath at Crowhill.

W. F. JOHNSON.

Poyntzpass.

Winter Flowering of *Corydalis claviculata*.

Notwithstanding the present frost and snow, *Corydalis claviculata* is already (February 2) in flower, the young shoots are six to twelve inches long, beautifully green and graceful as they are before me in a plate of water, the delicate tendrils arching and stretching out for support. The plant grows in the clefts of the Old Red Sandstone (which is mostly conglomerate rock here) on the Co. Waterford hills near Carrick-on-Suir, 500 to 600 feet over sea level.

J. ERNEST GRUBB.

Carrick-on-Suir.

Scirpus Savii, S. and M., growing inland.

In 1894 I gathered this plant at the S.W. base of the Great Sugarloaf, Co. Wicklow, by the edge of a pool at about 700 feet elevation. *S. Savii* plant appears so rare away from tidal influence, or at any rate away from sea-level, that this station may be worth recording.

R. LLOYD PRAEGER.

ZOOLOGY.

MOLLUSCS.

Arion empiricorum, Fer., var. Bocagei, Simr.

In the February number of the *Irish Naturalist*, Dr. Scharff has a short note on a recent paper of mine (*Journ. Malacol.*, 1899, vol. vii., p. 33), in which I recorded *Arion empiricorum*, Fér. var. *Bocagei*, Simr., from Ireland. I should not have trespassed on the valuable space of this Journal to notice his remark on the subject of the nomenclature of the British slugs, had his observations been correct.

Dr. Scharff states that "Some years ago Prof. Simroth described a new variety of the common slug, *Arion ater*, from Portugal, which, instead of being uniform in colour, was yellow above, with brown sides." A reference to Prof. Simroth's paper (*Nova Acta*, 1891, Bd. lvi., p. 347, t. xiii., figs. 1a, 1b), with which I presume Dr. Scharff is acquainted, proves that Simroth *did not describe a variety of A. ater*, which species finds no mention; but a variety of *A. empiricorum*, Fér. (*cf. op. cit.*, p. 346), as I have stated in my paper.

Dr. Scharff continues, "Mr. Collinge, it will be noticed, uses the name *Arion empiricorum* of Férussac, instead of the earlier *A. ater*, as he believes these to be two distinct species. *Professor Simroth and I* [the italics are mine] do not agree with him, and it certainly seems to me that *Arion ater*, being the older name, has the priority; and should, therefore, be used." Dr. Scharff is quite at liberty to use any name he thinks fit, but he must not expect malacologists either to agree with or follow him.

Prof. Simroth, in a recent letter, confirms my statement that he described a variety (viz. *Bocagei*) of *Arion empiricorum*; he further points out that *he has not yet decided* the point as to the specific difference of the forms *ater*, *rufus*, and *empiricorum*, for which I have described certain specific anatomical characters (*Journ. Malacol.*, 1897, vol. vi., p. 7, pl. ii.). From his published works, and the above-mentioned letter, it appears that *he does accept* the name *empiricorum* for the large black *Arion*; but whether *ater* and *rufus* are distinct from this species he has not yet decided.

Prof. Pollonera, the greatest living authority upon the European *Arionidae*, is also of the opinion that the species found in the British Isles is the *A. empiricorum* of Férussac.

It would be well another time if Dr. Scharff would take the trouble to ascertain the correctness of such a statement as he has criticised, by referring to the original description.

WALTER E. COLLINGE.

Mason University College, Birmingham.

It is to be regretted that so many records and so many misleading descriptions have been published in the *Irish Naturalist* and elsewhere by some of our most trusted leaders in Conchology, all of which are based upon a total misapprehension of the remarkable characters distinguishing the true *Arion ater*, var. *Bocagei*, a form not as yet found in

this country. The various descriptions published and applied to this remarkable variety and to its so-called sub-varieties are not merely incorrectly applied, but in all cases are diametrically opposed to the peculiar characters by which it is distinguished.

My wish for accurate identification and reliable records has induced me to point out that *Arion ater* var. *Bocagei* when adult is *totally white, except the locomotor disc, which is black*. This striking colouring does not however characterize its youthful stages, but is an accompaniment of full-growth.

JNO. W. TAYLOR.

Horsforth, near Leeds.

In reference to Mr. Taylor's note I should like to state that the sub-varieties to which he refers have never been regarded by me as forms of the var. *Bocagei*, Simr., but only as "closely approaching" that interesting variety. I have always been most careful to point out the colour of the foot-sole, which at once separates them.

I entirely disagree with the first paragraph in Mr. Taylor's note. If he will refer to my paper (*Journ. Malac.*, 1899, vol. vii., p. 33), he will find that I there stated that the form of *A. empiricum* which I had received from Ireland was "identical in all external features with the var. *Bocagei*, Simr." This specimen was full grown, with a perfectly white dorsum, and light sepia-brown or dirty straw-coloured, just above the foot-fringe, with an almost black foot-sole. Exactly similar specimens I have recently seen from Portugal, and also specimens with a perfectly black foot-sole and yellowish-grey dorsum; in both cases they were adult specimens.

The black foot-sole is the all-important feature, otherwise it is simply an approach to albinism, as Professor Simroth points out in the following sentence:—"Dr. Scharff's description is wanting as regards mention that *A. empiricum* var. *Bocagei* has a dark sole, with a light back. Without this I should simply think of albinism."—(*In litt.*, Feb. 22, 1900).

WALTER E. COLLINGE.

Mason University College, Birmingham.

Irish slugs are coming to the front, and are the primary cause of the above interesting notes and criticisms from our English friends. I am only the secondary cause in mentioning in the *Irish Naturalist* (February, 1900) Mr. Collinge's record of the variety *Bocagei* of *Arion ater* in Ireland. Let us take Mr. Collinge first. I have in no way criticized his statements. I have only made the observation that Professor Simroth and I did not agree with Mr. Collinge in the belief that *Arion empiricum* and *A. ater* are distinct species. In spite of what Mr. Collinge may say to the contrary, I repeat that this statement is perfectly correct. My only fault, as far as I can see, is that I followed Mr. Collinge in reproducing his erroneous record, as Mr. Taylor justly points out. Both Mr. Collinge and I were wrong in stating that the variety *Bocagei* (of *A. empiricum* or *A. ater*) is yellow (or yellowish) above, with brown (or sepia) sides. To Mr. Taylor belongs the credit of pointing out this serious error. It is all the more to be regretted therefore that Mr. Taylor should now add to the

already existing confusion in also quoting a somewhat incorrect description of the variety *Bocagei*. Mr. Taylor states that when adult it "is totally white, except the locomotor disc which is black." The description of this variety appeared in the *Nova Acta* (vol. lvi., 1891, p. 346), and is as follows (an absolutely literal translation is impossible):—"Var. *Bocagei* is whitish on the back and blackish brown towards the sole, which is rather dark, the colour of the locomotor field being distinctly separated. In larger animals collected in summer the back is lighter—light far down towards the sole, which is still darker."

R. F. SCHARFF.

Science and Art Museum, Dublin.

INSECTS.

Late Wasps' Nests.

One of the nests referred to by Mr. Moffat (p. 47 of this volume) was in "full blast" on Christmas Day—at least 15 wasps entering per minute and about as many leaving. Every mild winter here a few nests work away into January—some feebly, others strong—but I do not remember seeing any after 10th of that month. They usually seem to expire suddenly on the first heavy frost or rain after Christmas.

R. M. BARRINGTON.

Enniskerry.

Beetle Records from Co. Wicklow.

In connection with Mr. Johnson's note on *Otiorrhynchus auro-punctatus*, in the *Irish Naturalist* (p. 72 above), it may be of interest to record that I took a specimen of this insect in last July, at Ballybrood, Co. Wicklow. I have not seen any previous record from Wicklow. I should be glad if any reader of the *Irish Naturalist* could inform me as to the occurrence, in the Dublin and Wicklow districts, of *Sinodendron cylindricum*. In 1895 I took a male specimen in a piece of decayed wood, at Dollymount, Co. Dublin. Since that date I have not met with another specimen until July last, when I captured a female of the same species in the Powerscourt demesne, Co. Wicklow. The insect was, strange to say, flying, and pitched on my coat.

JAMES S. STARKEY.

Rathmines.

[Mr. Starkey's discovery of *O. auro-punctatus* from Co. Wicklow is of great interest, as this beetle had not been found hitherto south of Dublin. *S. cylindricum* is on record from Bray.—EDS.]

FISHES.

Sharks in Killala Bay.—A Correction.

The Sharks I recorded (p. 48 of this volume) have been, I see, named *Selache maxima* by the editors. This is an error, the species I intended to record being the Blue Shark (*Carcharias glaucus*). I now find that I also have given the species a wrong name, being misled by the description I received. Meeting Captain Kirkwood a short time ago I got from him

a correct description of the fish, which proves to be the Fox Shark (*Alopias vulpes*). It was about $13\frac{1}{2}$ feet long, and the elongated portion of the tail fin was *nearly as long as its body*, which I think proves it to have been the Fox Shark.

Moyview, Ballina.

R. WARREN.

BIRDS.

Snow-Goose in Ireland.

In the List of Irish Birds by the late Mr. A. G. More, he stated:—Mr. H. Blake Knox informs me that about 1st October, 1886, he received a fine male Snow-Goose, which had been shot by one of his tenants, near Belmullet, Mayo.

I am indebted to the kindness of Mr. Blake Knox for the loan of this specimen, which I sent for inspection to Dr. R. B. Sharpe, at the Natural History Museum, South Kensington. It was exhibited by him at the meeting of the British Ornithologists' Club on the 22nd of November, 1899, and is considered to be of the larger race named *Chen nivalis*, by Forster.

It should be remembered that Mr. Crampton's Snow-Goose, now in the Science and Art Museum, Dublin, was one of a flock of seven which visited the same part of Mayo, in October, 1877, and that other specimens were obtained in Wexford, early in November, 1871; while two birds were procured for the aviary at Knowsley, previous to 1851 that were said to have been met with among tame geese running on a green in Ireland. This is not impossible, for Mr. Crampton's bird above-mentioned lived under the same conditions for more than six years after he had been trapped.

Though birds of this species are believed to have been seen in the North of England, none have been obtained in the United Kingdom except in Ireland.

R. J. USSHER.

Cappagh.

Sea Birds and Severe Weather.

Sea birds, as well as land birds, suffer from exposure to cold. On February 17th, 1900, I noticed on the North Bull strand, Clontarf (an expanse of about three miles), the following dead birds:—

Three Oyster-catchers in a fresh condition—very thin, and slightly eaten by rats—and other birds, judging from the surrounding footprints.

One miserably thin Curlew, half buried in the sand, and only recently deceased.

Six Black-headed Gulls; some of these may have been previously wounded by gunshot.

Four Common Gulls; two of these fresh, but half eaten by rats and birds.

Five Herring Gulls; very thin—probably starved.

One Cormorant, and the fragmentary remains of a freshly-killed Mallard.

The bird footprints surrounding most of these dead birds were those of Gulls and Herons. These species have no objection to eating their dead comrades.

The date on which these observations was made immediately followed the very severe snowy weather of the first fortnight of February, 1900.

It was interesting to note that no Guillemots or Razorbills were washed ashore dead. This is due to the fact that the weather at the time, though extremely cold, was not particularly windy. These birds stand cold weather well, but rough seas destroy many of them by dashing them against the rocks.

CHARLES J. PATTEN.

Trinity College, Dublin.

MAMMALS.

The Hedgehog and its Food.

I beg to thank Mr. John H. O'Connell, for his observations (p. 50 of this volume) on Hedgehogs.

Mr. C. B. Moffat's contribution is very welcome. We have found that Hedgehogs eat *Helix nemoralis* and *H. aspera* with other species of Molluscs, sometimes eating the whole of the shells and at other times rejecting part. Mr. Moffat accuses the Rat of eating *Helix nemoralis*. Let us prove if this is well founded—the Field Mouse might also come within the scope of our investigations.

HUGH L. ORR.

Belfast.

The Irish Rat (*Mus hibernicus*).

A specimen of this rat has been lately killed here, which was very different in colour from any rat I have ever seen. The fur was of a brownish black colour, with occasional white hairs through it, shading off to quite pale brown on the lips and feet—and it had a large triangular white patch on the breast. The specimen was an old male, and had, unfortunately, lost half its tail when caught.

I sent it to Dr. Scharff, Science and Art Museum, Dublin, who says he has no doubt that it is a true Irish Rat, and not a brown one. It is still in his possession.

In the year 1890 I had a correspondence with Mr. G. E. Barrett-Hamilton on the subject of Black Rats, and at that time he seemed to think that they were probably commoner here than in any other part of Ireland, but I never saw a parti-coloured specimen before. They are now much less common here than they used to be.

DENIS R. PACK-BERESFORD.

Bagenalstown.

BOTANICAL NOTES ON THE GALWAY AND MAYO
HIGHLANDS.

BY NATHANIEL COLGAN, M.R.I.A.

It may sound like a paradox to say that the botanical survey of an Irish mountain region derives a peculiar zest from the very poverty of our flora in alpine species. Yet the assertion may be made with perfect truthfulness. That the rapture of discovery varies directly with the rarity of the object sought for, that the value of the thing attained is measured by the labour of attainment—these are time-honoured truisms in every system of proverbial philosophy; and their essential truth is daily borne in upon the mind of the botanist who devotes himself to the exploration of any of the mountain-groups of Ireland. The fans of the Alpine Club-moss, which he spurns with callous feet on the slopes of Snowdon, he half worships when they meet his longing eyes in the Wicklow or Kerry highlands; and so with many others of our alpine species—unconsidered trifles abroad, they become for him objects of enthusiasm at home.

It was with a full knowledge of this appetizing poverty of the Irish highland flora that my friend, the Rev. Canon d'Arcy, and myself turned our faces westward early in July last, bent on a fortnight's scrambling and plant-hunting amongst the Twelve Bens and the mountain *massif* lying east of Dhoo Lough in Southern Mayo. We had carefully studied beforehand Mr. H. C. Hart's admirable *Report on the Flora of the Mayo and Galway Mountains*,¹ indeed, we had carried it with us the year before in ascents of Muckanaght and Mweelrea, but it was with no intention of revising his work that we decided to follow in his track. Let it be said at once that we added nothing to the tale of alpine species observed by Mr. Hart seventeen years earlier, but that we learned a deeper respect for his powers as a botanist and a scrambler. The work which he did so well in one month we should have felt proud of doing in three, and, gleaning where he had reaped, we were satisfied with discovering a few new stations for the rarer plants.

¹ *Proc. R.I.A.*, 2nd series, vol. iii., p. 694.

On July 10th we established ourselves in Martin Joyce's roomy cottage at Cloonacarton, Glen Inagh, scarce a mile and a half from Recess railway station and within easy distance of the highest summits of the Twelve Bens. Here the vagabond botanist finds an ideal resting-place, where he can "enjoy the comforts of home combined with moderate charges," and with perfect freedom to surround himself with that litter at once so essential to his happiness and efficiency, and so odious to the ordinary hotel manager. When one stands in Joyce's rough meadow, where the *Dabcoia* trails over the rocky knolls, the shapely pyramid of Ben Corr is the point that above all others catches and holds his eye. The great rock-buttress, stretching eastwards from the summit and crowned with what seems to be a very steeply pitched *arête*, looks most seductive to the climber, especially when viewed in the evening light from a boat mid-way up the lake : at all times and from all points of view the whole mountain, a grey mass of arid stone, looks absolutely repulsive to the botanist.

Our first day's scramble on Tuesday, 11th July, was up Ben Corr by this rock-buttress. The hoped-for *arête* turned out to be a delusion. It was merely a steep staircase of shattered quartzite, flanked here and there by cliffs, and the poverty of the flora even exceeded our expectations. Though we followed the high ridge running south from Ben Corr to the summit of Derryclare Mountain and descended thence to Derryclare Lake, keeping well over 2,000 feet for a considerable distance, we found only two alpine, *Arctostaphylos Uva-ursi* and *Juniperus nana*. The first occurred rather sparingly, the second was most abundant, and spreading out in wide sheets tipped with the tender green of the young shoots, gave a peculiar character to the summit-ridge and the higher slopes. Great bosses of Thrift, rosettes of the Fox's Cabbage (*Saxifraga umbrosa*), and occasional sheets of the Sea Campion (*Silene maritima*) relieved the monotonous hue of the naked rocks, and here and there Saint Dabeoc's Heath was found flowering up to fully 1,800 feet.

Next day, July 12th, we crossed the naked Maam Turk range by the well-marked maum or gap between the rocky summits of Ilian and Derryvoraihedlia into the lonely Glen Glosk without noting a single plant of interest ; the 13th was rainy,

with the hills wrapped in cloud, so that we had to postpone a contemplated ascent of Ben Baun, or the White Mountain (2,395 feet), the highest point of the Bens, until Friday, the 14th. This was a perfect day, and taking Joyce's car for some six miles up Glen Inagh, we attacked the mountain by the long spur running north-east from the summit. The end of this spur is marked by a point reaching to 1,362 feet, named Knockpashemore on the Ordnance map, and here on cliffs facing north at about 1,300 feet we found *Sedum Rhodiola* in a new station for the Twelve Bens. At 1,200 feet a few plants of *Lastrea æmula* were observed, and on and near the summit Thrift appeared in fine bosses interspersed, as on Ben Corr, with sheets of Sea Campion. From the top of Ben Baun, well named from the light-coloured screes seaming its upper slopes, an impressive wilderness of stony peaks and deep-cut glens opens out, a dismal prospect to the botanist, but not without stimulus to the lover of unadorned solitude. There is just one point in the near prospect on which the eye of the botanist can linger with pleasure, the great truncated cone or gable-end of Muckanaght, a mile distant towards the west, its verdant slopes standing out in marked contrast to the surrounding desert of grey stone. This oasis of schist in a Sahara of quartz is the "crowning mercy" of Mr. Hart's indefatigable labours of seventeen years ago, and no other point in the Bens, least of all Ben Baun, can compare with it in the richness of its alpine flora.

We came down south-east into the head of Glen Inagh where the Glen Inagh river takes its rise under the grand rock-face of Bencailliaghduff. For austere beauty this thousand feet of precipitous crags is perhaps unsurpassed in the whole group of the Twelve Bens, and as a training-ground for moderately ambitious climbers it seems well worthy of attention. The deep-cut channel of the infant Glen Inagh river gave us abundance of finely developed *Crepis paludosa*, and at a height of about 800 feet appeared a most remarkable variety or form of *Saxifraga stellaris*, somewhat approaching to the arctic var. *comosa* of Poiret, synonymous with *S. foliolosa* of Robert Brown. At first sight the Glen Inagh plant, which grows in considerable quantity recumbent on moss-clad stones in the bed of the main stream and of a tributary rill, appears

to be a luxuriant viviparous form of *S. stellaris*, with much branched panicle and the flowers transformed into minute rosettes of leaves. But a closer examination shows that while some of these leaf-rosettes are derived from flowers, others, and by far the greater number of them, are quite sessile on the panicle branches in positions where the flowers are never found in typical *S. stellaris*. That the plant does belong to this species is testified by the few flowers which remain untransformed at the extremities of the panicle, though the leaves in the basal rosette with their long, winged footstalks more resemble those of the North American *S. leucanthemifolia* of Michaux. Mr. Arthur Bennett tells me that he has a specimen from alpine rocks near Largs, Ayrshire, nearly as foliaceous as the Glen Inagh plant.

The whole of the eastern face of the Twelve Bens, though much of it lies at an elevation of over 2,000 feet, gives but four Highland Type plants—*Saxifraga stellaris*, *Sedum Rhodiola*, *Arctostaphylos Uva-ursi*, and *Juniperus nana*—while the isolated hill of Lisoughter, on the opposite side of Glen Inagh, and reaching to little more than 1,300 feet, gives no less than six—*Dryas octopetala*, *Saxifraga oppositifolia*, *Hieracium anglicum*, *Juniperus nana*, *Asplenium viride*, and *Selaginella selaginoides*. Here, in August, 1898, we found *Saxifraga oppositifolia* descending alongside a rill in abundance to the low level of 450 feet.

On Monday, the 17th, we drove from Joyce's to Leenane, where we found good quarters in the modest Mweelrea View Hotel. On the road, in a moorland *loughaun* east of Lough Fee, we saw the Yellow Water-lily, apparently a rare species in West Ireland. The afternoon was given up to a pleasant scramble on Benwee, a point rising to 2,000 feet just behind the hotel, and having some well-placed cliffs near the top. Here *Thalictrum collinum*, *Sedum Rhodiola*, *Hieracium iricum*, *Saxifraga stellaris*, and *Carex rigida* were gathered, and a solitary plant of *Habenaria albida* was observed at 1,600 feet, the highest Irish station so far recorded for the species.

Tuesday, the 18th, was spent on the high mountain-ridge north of Glenummera, a glen running due east from the foot of Dhoo Lough, in County Mayo. For two miles this ridge maintains a height of little less than 2,400 feet, and in one

point exceeds 2,500 feet. Mr. Hart explored this ridge in 1882, and in the absence of any definite name on the Ordnance map he styles it Loughy. The only local name we could find for it was Sheffry; but no doubt neither name is applied to the whole ridge by the handful of shepherds which makes up the population of Glenummera. The ascent from the valley floor to the highest point was over monotonous grassy slopes, and no plant of interest was noted until the crest of the ridge was reached. Here *Lycopodium alpinum*, already recorded by Mr. Hart, appeared in abundance, and we afterwards traced it for fully a mile eastward along the crest. Nothing could look more disappointing than the reverse or northern slope of Sheffry. Looking eastward, it presented an extremely steep talus of finely broken slate, like the rubbish scree of a great Welsh quarry. Here and there knobs of rock protruded from its upper reaches, but the whole looked painfully dry and naked. Turning westward, the form of this northern slope looked somewhat more promising. Bastions of steep rock, arranged in ledges, capped the talus for a height of about fifty feet, and a careful examination of these was rewarded by *Saussurea alpina* in a new station. It occurred here in considerable quantity at a height of 2,200 feet, and re-appeared at 1,600 feet further to the eastward on the same slope. Hitherto this alpine has in District VIII. been known only from one station in Mayo, Croaghpatrick, where Mr. Hart discovered it in 1882. A glissade on the steeply pitched slopes of shifting slate débris took us down 500 feet to its base in a few minutes, and here, on moist rock-shelves, at about 1,500 feet, *Thalictrum alpinum* and *Selaginella selaginoides*, both new to Sheffry, appeared in abundance. Returning to the crest of the ridge in thick mist we found on rocks near the top *Sedum Rhodiola*, *Oxyria reniformis*, and *Carex rigida*, the latter, as Mr. Hart has pointed out, almost ubiquitous on the higher mountains of Galway and Mayo. It was nightfall when we reached Bundorragha ferry on the Killary, thoroughly soaked by some three hours of steady rain, but well pleased with the results of our long day.

The alpine flora of Sheffry, adding to Mr. Hart's list the few additions we were fortunate enough to make, numbers no less than 11 species:—*Thalictrum alpinum*, *Sedum Rhodiola*, *Saxifraga stellaris*, *S. oppositifolia*, *Saussurea alpina*, *Vaccinium*

Vitis-Idæa, *Oxyria reniformis*, *Salix herbacea*, *Carex rigida*, *Lycopodium alpinum*, and *Selaginella selaginoides*. This total compares very favourably with that for the great mass of Mweelrea, whose imposing ranges of lofty cliffs yield only 12 alpine or Highland Type species.

A quiet day at Leenane, and on Tuesday, July 20th, we drove by the beautiful Erriff Valley to Westport, whence we took the afternoon train on to the picturesque little town of Newport. Here, as at Westport, we were surprised to find *Matricaria discoides* established in abundance, as already recorded in the *Irish Naturalist* for October last. We fixed our quarters at Newport for a few days for the purpose of climbing Cushcamcarragh (2,343 feet), the second highest point in the Nephin Beg mountain-system, which, with the wide-stretching bogs that isolate it on north and east and west, forms, perhaps, the largest wilderness in all Ireland. Mr. Hart explored, or, rather, reconnoitered, this region in 1882, attacking it from the north and traversing its peaks and ridges from Deel Bridge to Newport in one arduous day's tramp. Disheartened by the botanical nakedness of the country, he made no further exploration of it, and does not appear to have climbed Cushcamcarragh, or Cushcam, as it is locally called.

On the 21st July, a breathless, hazy day, we made the ascent by a four-mile-long ridge which runs north to the summit from the Mulranny high-road near the hamlet of Maryland. The top of the mountain when we reached it proved to be a fine piece of rock-sculpture, a narrow crest, at one point passing into a true *arête*, and rising here and there into rocky pinnacles as it swept south-eastward into the long and lofty ridge which links it with Bengorm (1,912 feet). Clambering down the steep northern slope to the floor of Glenamong, we found nothing rarer than *Saxifraga stellaris*, and after a short halt we returned to the crest by some steep gullies facing north-east. On our way up, at a height of from 1,500 to 1,800 feet, we came across *Saxifraga oppositifolia* and *Oxyria reniformis* in abundance, both additions to the flora of the Nephin Beg region, and the first previously recorded for the County Mayo only from Mr. Hart's station on Loughy or Sheffry Mountain. Near the crest, along the northern face of

the *arête*, which gave us a few yards of hand and foot climbing, *Carex rigida* and *Salix herbacea* turned up in abundance, as we fully expected they would.

The view northward from the summit of Cushcam extended as far as the eye could reach over a perfect desert of mountain and lough-strewn bog, the form of the mountains as seen from this point fully justifying Mr Hart's depressing estimate of their botanical capabilities. Close at hand, to the south-west, the mountains looked more promising, but we had no time to explore in this direction. The examination of some of the cliffs towards Bengorm, the descent to Glenamong, the tramp along its rough and trackless bogs, with an assiduous escort of bloodthirsty midges, and the final descent along the western shore of Lough Feeagh to the Newport high-road by a rocky mule-track worthy of the Spanish Pyrenees—all this was more than enough to fill in the day's work, and to convince us that we had fully earned our two additions to the Nephin Beg flora. As at present known, the alpine flora of this extensive region is certainly a poor one, numbering but 8 species altogether:—*Sedum Rhodiola*, *Saxifraga stellaris*, *S. oppositifolia*, *Arctostaphylos Uva-ursi*, *Oxyria reniformis*, *Salix herbacea*, *Carex rigida*, and *Isoetes lacustris*.

July 22nd was a lazy day, spent round about the southern end of Lough Beltra, the fine sheet of water from which the Newport river rises, some five miles north-east of the town. Amongst the sixty-odd species jotted down in a hasty survey of one of the islets at this end of the lake were *Galium boreale* and *Crepis paludosa*, and on our way back to Newport *Juncus obtusiflorus* was gathered in wet bogs by the roadside. On the old bridge at Newport we found *Sagina apetala*, hitherto unrecorded for District VIII. of *Cybele*.

On Monday, the 24th July, we pushed on from Newport to Dooagh, in Achill Island, where we found in an inchoate hotel accommodation fully on a level with the sobriety of our expectations. It may be doubted whether this hostelry, situated though it is in the most picturesque part of the island, will ever be made attractive or, indeed, tolerable for the tourist. If not, the adventurous pilgrim can at least count on finding there ample opportunity for the practice of plain living and the study of modern Irish. Dooagh is within easy

reach of Croaghaun (2,192 feet), and we promised ourselves a glorious day on the crest of its famous sea-cliffs when we turned in that night. We had a lively day's work, though not quite what we had expected, for when Tuesday morning broke a half gale was blowing from the west, with frequent bursts of rain, and the clouds lay heavy on the flanks of Croaghaun down to 300 feet above sea-level. It was manifestly impossible to stay fuming within doors in such weather, so we started for the mountain armed with waterproofs and a compass, and felt our way to the top by bearings taken from the shores of Loughacorrymore. The last half hour's struggle up the final scree, on all fours against the powerful blast, was inspiring, but botanising was far from easy, and the only result achieved here was a high station for *Hymenophyllum tunbridgense*, which we found in good fruit at 1,900 feet. The alpine species observed numbered but three :—*Arctostaphylos Uva-ursi*, *Juniperus nana*, and *Carex rigida*.

We came back to Dooagh by way of Keem Bay and the fine cliff road, held a Gaelic symposium that night, at which the local "men of light and leading" attended to read and discuss Dr. Hyde's folk-tales in the vernacular, and on the morrow turned our faces regretfully towards the east and civilization.

Rathmines, Dublin.

STARFISHES AND THEIR RELATIONS.

A Treatise on Zoology. Edited by E. RAY LANKESTER, I.L.D., F.R.S. Part III. **The Echinoderma.** By F. A. BATHER, M.A.; J. W. GREGORY, D.Sc., and E. S. GOODRICH, M.A. London: Adam and Charles Black, 1900. Pp. viii. + 334. 15s. net.

TEN years ago it was difficult to find an English work which gave a good account of general zoology, and those in use were mostly translations from the German. But a number of general works on this subject have been published within recent years, so that things have very much changed now. The difficulty at present seems rather to know which one to choose among the number of books written by British authors. What is known as the "type-system" of zoological work has been much in vogue for some years, and the market is now well supplied with books containing minute descriptions of one species or "type" out of every large group of animals, everything else being condensed to the utmost.

The first instalment of Professor Lankester's *Treatise on Zoology* has now appeared. It is not one of that class of works just referred to. On the contrary an attempt is made to mention every known genus, whether recent or fossil. The general aim of the work is to give a systematic exposition of the characters of the classes and orders of the animal kingdom, but it is intended rather to assist the student who has already acquired a preliminary knowledge of zoology and who wishes to proceed to a more thorough study of the subject. The volume just issued has an introductory chapter containing a general description of the sub-kingdom or phylum Echinoderma (sea-urchins, starfish, &c.); then follow chapters on the various classes, viz.: Cystidea, Blastoidea, Crinoidea, Edrioasteroidea, Holothuroidea, Stelleroidea, and Echinoidea. One of the principal merits of this treatise is that the extinct groups of animals are dealt with quite as fully as the recent ones. The idea of giving a continuous detailed history in which the evolution of a series of forms may be traced from the earliest Palæozoic periods up to the present day is an excellent one, and no book attempting such a task in so comprehensive a manner has ever been written.

The present volume contains a vast amount of information, yet it is inevitable that the various groups of Echinoderma should have been treated somewhat unequally. It is perhaps not in the scope of the work to enlarge too much upon the habits and the mode of life of the animals referred to, still it seems strange that scarcely any special mention is made of these particulars in the case of the Crinoidea and Stelleroidea, whilst as regards the Echinoidea we get a brief description at least of their mode of life.

The announcement by the Editor that the treatment of the subject must necessarily be brief, as the treatise will have to be completed in ten volumes, will give the student some idea of the magnitude of the subject and of the advances which have been made in recent years. Professor Lankester is assisted in his great undertaking by a number of experts—mostly graduates of the University of Oxford, who have promised to contribute portions of the work. The names selected are a sufficient guarantee that the volumes when completed will be thoroughly reliable and satisfactory.

A most useful bibliography of the groups described is given at the end of every chapter. The index at the end of the volume might with advantage be enlarged, so as to include the family names, which have been left out, and increase the number of cross-references.

The book is excellently printed and illustrated by a large number—about 300—of clear and useful figures, most of which are original. This great work will be indispensable to all teachers and advanced students of zoology, and especially to curators of natural history museums, and it is to be hoped that the remaining volumes may soon be published.

R. F. S.

THE CRABS OF OUR SEA-SHORE.

BY W. H. CUNNINGTON, A.R.C.SC. LOND.

[Read before the Dublin Naturalists' Field Club, 12 December, 1899].

THE crabs of the Irish area have by no means received the attention they deserve, and in consequence, we have not yet such satisfactory lists of the forms which have been found, as we should, and easily might have. I lay stress upon this particularly, because it affords an opportunity for the members of this Field Club. Everyone, at some time or another, has found crabs, whole or fragmentary, during walks along the shore. The fishermen, too, frequently bring in with their more valued relatives, a variety of strange crabs, which might be easily secured, as they are of no use to them. Again, crabs are almost entirely identified by peculiarities of external structure, and so to a large extent, a dried specimen will answer for our purposes. Thus, a specimen not very fresh, or even an empty shell, would not be necessarily valueless.

The habits of crabs, as of other animals, are largely reflected in their form and structure. That is to say, we may expect to tell at a glance, by some very striking differences, whether we are dealing with swimming crabs or running crabs, with burrowing crabs or land crabs. This in fact is the case, and we may always recognise a swimming crab for example, by the flattened condition of his legs, while the last joint of the last pair of legs is generally expanded and plate-like.

Coming to deal with particular forms, I should, perhaps, mention first the GREEN CRAB (*Carcinus menas*), as it is undoubtedly the most common on our shores. This creature belongs to the group of the swimming crabs, although it can run about on land well enough, and has not attained to the flattened end of the fifth leg, so characteristic of its relations. The shell, too, which is somewhat broader than long, has the front edge divided up into a number of prominent teeth. These crabs do not ever grow very large, but perhaps make up for this in numbers, as they may always be found on our shores, lurking in little rock-pools and beneath stones and sea-weed. Their food, in common with most crabs, consists of young fish, small shrimps, and such like; but they are greedy little things, and no kind of animal refuse seems to

come amiss. The eggs, which may be laid at any time from spring to autumn, are buried in the sand, and from them emerge—not young crabs—but forms so perfectly distinct as to have originally received a separate name. We are dealing here then, as in most of the crabs and lobsters, with a distinct metamorphosis, a larval form being set free from the egg, which sooner or later however, assumes the adult condition. Though differences, of course, exist between the larval forms of different crabs, the plan followed here is really pretty typical. The little organism on emergence is known as the *Zoea* larva, and certainly is a most grotesque-looking object, with enormous eyes, and a head shield armed with long spines. From this stage, by the shedding of the skin we get another—the *Megalopa*—which is certainly far more crab-like, and has the pincers and walking legs developed, though the tail is still in the primitive position, and not tucked up. A third moult, and we have once again a young crab differing but little from the adult.

This Green Crab was at one time extensively brought to the markets as food, but is now seldom eaten, except perhaps by the very poor in some parts. It makes very good bait, however, especially when soft, after shedding its shell, and in certain parts of the coast the fishermen have devised a very simple trap to catch them for this purpose.

This consists of nothing more than the placing between tide-marks of a number of common half-round roof-tiles. Beneath these convenient shelters, the crabs about to moult naturally creep, so that the fishermen have merely to go at low tide and pick them out.

Portunus the Fiddler Crab, and *Portumnus* are among the commonest of the other Irish swimming crabs, and they, of course, have the oval flattened joint to the last leg, which is so noticeable a feature. The name of "fiddler crab" has been given to *Portunus* by the fishermen, because of the see-saw motion of the bent and flattened leg-joints, which is supposed to suggest the operation of fiddling. These forms are both good swimmers, but are eclipsed in this direction by *Polybius*, which is perhaps the strongest swimmer of all. The other legs here have also become extremely flat and thin, and by aid of them all, the creature skims about, up to the surface of

the water if need be. It is said that *Polybius* even pursues active fish like the mackerel, and fastening on to one by its sharp and powerful pincers, holds tight until its victim is exhausted.

Another group of curious, and in some cases quite weird-looking crabs, is that containing the spider-crabs. These forms, as their name sufficiently denotes, possess long spidery legs, with comparatively small bodies, which latter in this case, are triangle-shaped, with the point directed forwards. Notwithstanding all their long limbs however, they are sluggish, slow-moving animals, and in consequence readily fall a prey to fishes and other enemies. Nature, which generally devises some plan for the protection of slow-moving or awkward forms, has here accomplished that purpose in a very interesting way. For years before the true nature of the case was understood, these crabs had specially attracted the attention of observers, from their very untidy appearance. Their shells were generally more or less overgrown by seaweeds or various kinds of fixed and colonial animals. Fortunately some of these forms have been kept in captivity of recent years, so that their habits have been definitely observed. The crab known as *Hyas*, which has not really such very long legs, but evidently belongs to this group, is usually so overgrown by colonies of sea-mats, etc., that its true form is entirely hidden, and one can well believe that it would be well-nigh indistinguishable in its native wilds. But although these organisms are growing happily on the crab's shell, they did not settle there of themselves, as one might perhaps suppose. It has in fact been observed that these crabs, if placed quite clean in an aquarium with sea-weeds and living sea-mats, will actually tear off little bits of them, and deliberately plant them on the back of the shell! By their marvellous, instinct too, the crabs know well enough what organisms will bear this rather rough-and-ready transplanting, for the pieces they plant are always such as will live and grow. All the observers who have had these interesting creatures under their notice, remark on the effectiveness of the disguise, and in fact there have been cases in which the crab was at first thought to have escaped, from the way in which it had entirely disappeared.

Even further than this may the discriminating powers of these crabs be displayed, for not only will they cover themselves with these protective clothes, but they will take them off again if need be. If a *Hyas*, covered it may be, by bright-coloured sea-weeds, be placed in a tank, containing, for example, more sombre-coloured sponges, the creature will be found after a little while to have diligently plucked off all the bright colours, and covered itself once more with fragments of the surrounding sponge. There is yet another curious feature about *Hyas*, in which it differs from other spider-crabs. The pincers are very white and clean, and the creature is seen to keep them constantly moving, in a rhythmic fashion, these white points thus appearing very conspicuous objects, where the animal is almost hidden by its living covering. The meaning of this apparent anomaly was discovered a few years ago by the Messrs. Dixon, formerly of Trinity College, Dublin. On one occasion they happened to introduce into the tank containing a *Hyas* a number of small gobies. These little fish had their curiosity at once aroused by this white vibrating structure; but the moment these investigations brought one well within reach of the concealed crab the unfortunate fish was seized and devoured. Thus, you see, the conspicuous whiteness of the claws really acts as a very efficient lure into the neighbourhood of the watchful, but almost invisible crab.

Besides *Hyas* there are several other spider-crabs among the inhabitants of our shore, and they all exhibit more or less this remarkable habit of dressing themselves with the surrounding organisms. Among them I may mention the forms *Pisa*, *Inachus*, and *Macropodia*, the Long-legged Spider-crab, while *Mais squinado*, the Spiny Spider-crab, is far the largest of them all. The latter is indeed the largest of all the British species with the exception of the Edible Crab (*Cancer pagurus*) which, as you know, is sometimes taken of a great size. In some parts it is said to be commonly found as much as nine or ten inches in length. A curious case of companionship is sometimes to be made out here, for another little Crustacean, *Isæa* by name, has been found clinging to the crab's shell, by means of the broad serrated ends of its feet, which are thus specially well adapted for the purpose. Strange to say, this particular form seems to be never found anywhere else.

Gonoplax the Angular Crab, is another remarkable form, but one which is by no means common on these shores, though it is among the known Irish species. The pincer-legs are here enormously long, while the eyes again are very noticeable by being placed on extremely long stalks. The pincers, further, have the joints so situated that while food can be seized at a considerable distance, it can also be conveyed to the mouth. The male is in the habit of clashing together these great nippers, in a noisy and threatening manner; or at any rate has been seen to do so when in captivity. The creatures are said to live in burrows formed in hardened mud, which dwelling-places they leave open at both ends. They would seem to form a very favourite food for the Cod and such like fishes, for they are not infrequently found in their stomachs.

The form *Corystes*, which is rather more frequently taken on our coast, belongs to a group which, in many ways certainly, seems to carry us towards the hermit crabs. The head-shield is considerably longer than broad, while a very striking feature is the length and nature of the antennæ. The nippers of the male also are very long, but in the female the claws are very ordinary in size. The back of this creature, at any rate to the vivid imagination of some of the older observers, has considerable resemblance to the human features, a fact which has attracted to it far more attention than on that account it deserves. Its popular title of the "Masked Crab" is due to this, and it is very funny to see how in some of the figures by the old writers this supposed resemblance has been purposely accentuated. In its habits, nevertheless, *Corystes* is so interesting as to well merit our further notice.

It is a sand-burrowing form, and the last joints of its legs have become elongated, sharp and claw-like, in connection with this habit. When commencing operations the crab sits upright on the surface of the sand, and by digging its legs in deeper and deeper, pulls itself down, while the claws are engaged in pushing at the sand in front to prevent it getting into the mouth apparatus. When the body has completely disappeared beneath the surface of the sand, the long antennæ, which still project, are generally seen to be rubbed against one another, apparently to get rid of any sand sticking to them. Now by placing the antennæ side by side, the long hairs fringing them interlock, and the crab is provided with a

perfect little tube placing him in communication with the outside world. The process of burrowing will then go on still further, until nothing remains visible but the tip of this tube. Resting thus passively in its bed of sand, *Corystes* spends the daytime concealed from observation, though at night it apparently comes out, and wanders about in search of food. One operation at any rate—that of respiration—has to be carried on even beneath the sand, and this is effected through the medium of the antennæ tube. By experiments in which coloured water was introduced close to the tube of a buried crab, it has been ascertained that the water is always sucked down through it, finally passing out from the gill chambers at the sides. Recalling what is the normal direction for the water flow, it will be seen that the condition here is precisely the reverse. Occasionally, and for a moment or two, apparently when the crab wishes to throw out some objectionable particle, the current is changed, and becomes normal in direction. The reason for the existence of this reversed current, as the usual condition, in a buried *Corystes*, is not far to seek. It is simply the outcome of its burrowing habit, and is a beautiful adaptation to altered circumstances, for it is obviously far more satisfactory to draw water from the clear region overhead than to attempt to suck it in at the sides when buried in sand.

Turning to the hermit crabs themselves, we find a number of remarkable features to be noticed in them. The most familiar ones to us, those which live in old whelk-shells and the like, are perhaps rather more like the lobsters; but among the group, we find some, which very largely fill any gap there may be between these two main divisions.

Dromia, a form which has been taken off the southern British coasts, but which is far commoner in the Mediterranean, still approximates to the crabs proper, though a good deal of its tail is to be seen in a top view, and the last two pairs of walking legs are almost shifted up on to its back. This creature, too, may do something towards hiding itself by other objects; one is often found covered by a sponge. Among some foreign allied forms another plan is adopted, where the animal holds tight by its upturned hind legs to a mangrove leaf, or old bivalve shell, which it carries about with it.

Porcellana, too, belongs also to the group of the hermit crabs, and is found on several parts of the Irish coast. This again is crab-like in general appearance; but on looking more closely we at once notice important differences. The last pair of legs is very small, and tucked up over the back, in a manner which is characteristic of many of these allied forms, while the tail is not at all of the typical crab form, but possesses those broad wing-like expansions which we notice in the lobster. The feelers, particularly the antennæ, are very long in proportion, while the claws are curious great clumsy-looking things. The creatures are usually found under stones, between tide-marks, or else occur in shallow water on a rocky bottom. The zoea larva of this form is a truly romantic-looking creature, and one really cannot help wondering how it can manage such a long spine at all.

The common hermit crabs, such as inhabit old mollusc shells, belong principally to the genera *Pagurus* and *Eupagurus*. Perhaps the commonest of all—the “Soldier Crab,” so called—is *Eupagurus Bernhardus*. In the greatly elongated condition of the antennæ, and in the large size of the tail region we see points of agreement with the lobsters, while the eyes are here situated upon considerable eye-stalks. Degeneration has most evidently been at work in these forms, for otherwise why should all the tail region be so soft and membranous that the creature is forced to seek protection for it in some shell? Again in connection with the habit of thus protecting its tender parts, the last legs have become greatly modified—the first two pairs only remaining normal, for walking purposes, while the last two are concerned with clinging into the shell. Further, as an adaptation to this mode of life, the tail region, which was primitively quite symmetrical, has acquired this one-sided lateral twisting, and it is most interesting to note that in the earliest stages of their life the young crabs are perfectly symmetrical. In the course of their growth, it stands to reason, that these crabs have several times to move lodgings, so that one may find different-sized animals in a variety of different shells, from the humble periwinkle up to the whelk, a full-sized specimen of which is necessary for a well-grown adult crab. Whether the hermit always chooses for his habitation an empty shell, or whether he may not seize and kill the owner of a suitable one, is a point which has not been definitely settled.

That empty ones are sometimes used I think there can be no doubt; but at the same time it is quite likely that, under certain circumstances, the Soldier Crab is true to his name, and makes a murderous attack upon some inoffensive snail. A curious habit of companionship, or to give it its more proper name, *commensalism*, has been noticed in Prideaux's hermit crab, *Eupagurus Prideauxii*, which is also common enough on our shores. This creature is seldom found without a sea-anemone—*Adamsia* by name—living on its shell. Of the mutual advantages to be gained by this association we can at least suggest one or two. The anemone, in course of time, tends to absorb the heavy shell of the crab, which would be some advantage, and again, while certain fish are very fond of hermits, which they swallow shell and all, few of them would be much inclined to tackle the sea-anemone. The latter, however, on the other hand, gets its share of advantage, from the crab's moving powers, which take it about from place to place in search of food.

And now to return to the practical side of the question. How are crabs to be found, or where are we to look for them? A crab hunt is neither a difficult nor a very exacting occupation. Go at low water, or when the tide is some way out, to any rocky piece of shore, and search in the rock-pools, and beneath the masses of sea-weed. Turn back the growing patches of bladder-wrack, and look beneath stones, and before long you may be sure to find some little fellows, snugly hidden away.

Royal College of Science, Dublin.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include eight Peruvian Cavies from Miss Fennell-White, a Monkey from Mr. E. Marshall, three Bramblings from Mr. E. Williams, a Bear cub and a Silver Fox from Mr. N. H. P. Vickers, a White Pheasant from Lord F. Fitzgerald, and a Royal Python and a lizard from the Hon. P. C. Smyly. A pair of Racoons, a pair of Hairy Armadilloes, eighteen monkeys, and seven Rose Cockatoos have been bought.

6,963 persons visited the Gardens in March.

CORK NATURALISTS' FIELD CLUB.

MARCH 21. ANNUAL MEETING.—The annual meeting of the Cork Naturalists' Field Club was held in the Assembly Rooms: Mr. T. Farrington, President, in the chair.

The Treasurer's report showed that the society began the year with a credit balance of £7 10s. 9d. The subscriptions for the year amounted to £11 5s., and the expenses, including the usual contribution to the *Irish Naturalist*, was £11 18s. 6d., leaving a balance to be carried forward of £6 17s. 3d.

The Secretary's report showed a small falling off in membership during the year. In all nine excursions were held during the season, amongst the places visited being Little Island, Rochestown, Douglas, Youghal, Macroom, Ardrum, Healy's Bridge. During the winter three lectures were arranged for, one of which was delivered by the President on "Some Relations of the Atmosphere to Plants" on October 19th; another on December 6th on "Some Paths of Science," by Mrs. E. Brooke Hughes, and their season would close that evening with a lecture by Mr. Porter on "The Geology of the Bandon Railway."

The Chairman said there was a prospect of improving on one of last year's excursions this year. When they visited Ardrum last year they had nobody to show them over the place, and they did not get entrance to Ardrum House. If another visit were organised he was informed they would get on better.

The meeting then proceeded with the election of President and officers for the following year, when the following were appointed:—President, Mr. Farrington; Vice-Presidents, Miss Martin, Professor Hartog, Messrs. Copeman, Shaw, Bennett, and Lund; Secretary, Mrs. Brooke Hughes; Curator, Mr. R. A. Phillips; Committee, Messrs. D. Franklin, J. Noonan, W. B. Lacy, W. H. Johnson, and F. R. Rohu.

Some arrangements having been decided on with regard to the forthcoming excursions, the meeting terminated.

NOTES.

BOTANY.

The Dublin Field Club Prize Scheme.

I hope the prizes offered by the Committee of the Dublin Naturalists' Field Club will not result in the diminution of any of our rarer plants. In 1864 the Royal Horticultural Society of England offered prizes for the best collections of dried wild flowers collected in that year in any part of the United Kingdom, and I well remember the outcry then made by botanists who feared that competitors might imagine that the rarity of a specimen increased the value of the collection. It ought to be made quite clear in the Irish botanical competition of 1900, that there is no inducement held out to gather any rare species whose numbers are diminishing.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

By the courtesy of the Editors we have seen Mr. Barrington's note. The Committee of the Dublin Naturalists' Field Club fully appreciate the value of his suggestions, and indeed had already stipulated that any collection which bore evidence of undue interference with rare plants or animals should be thereby disqualified, and it was only by inadvertence that this was omitted from the printed rules. Intending competitors will therefore note this.

N. H. ALCOCK, }
C. J. PATTEN, } Hon. Secretaries.

Trinity College, Dublin.

Irish Topographical Botany.

For four years past I have been engaged on a work which proposes to show the distribution of flowering plants, &c., in Ireland, so far as present information goes, in the forty divisions (counties or portions of counties) into which, in a paper published in 1896 in the *Journal of Botany* and *Irish Naturalist*, I divided the country. The work is now sufficiently far advanced to show the deficiencies in each of the county lists. A number of common plants still remain unrecorded from all but a few counties, and plants of frequent occurrence are still wanted from almost every county. I shall esteem it a great favour if readers of the *I.N.* will assist the completion of the county lists in either of the following ways:—
1. By furnishing me with unpublished notes of plants observed in any part of Ireland. A definite record of *any* species in *any* county, giving place, finder's name, and date, will be welcome. 2. By searching in any county for plants still unrecorded from same. As I hope to publish early in 1901, the coming season will be the last during which information supplied can be incorporated in the work.

Dublin.

R. LLOYD PRAEGER.

Ranunculus parviflorus in Co. Wexford.

I believe this plant is sufficiently rare to merit a record of its occurrence in a new locality. This is on the roadside not far from the New Ross workhouse and before the workhouse is reached on the way thither from Kilmanock. Other Wexford localities for this plant have been given by Miss L. S. Glascott and myself in the *Journal of Botany* for January, 1889, and these, together with two others, are quoted in *Cybele Hibernica*, ed. 2, p. 10 (1898).

G. E. H. BARRETT-HAMILTON.

Kilmanock, Co. Wexford.

ZOOLOGY.

INSECTS.

Acanthosoma hæmorrhoidale in Co. Antrim.

This plant-bug has been found on a window-blind in my sitting-room. I have sent the specimen to Rev. W. F. Johnson, of Poyntzpass, and think a notice in the *Irish Naturalist* may be desirable, as I believe the species has not previously been taken in this county.

S. A. BRENNAN.

Knocknacarry, Co. Antrim.

Notes on Coleoptera.

I must thank Mr. Johnson for his congratulations and good wishes (*supra*, p. 70). There are one or two points in his notes which do not concur exactly with my own observations, to which I should like to draw attention. While I fully accept his observation that many of the *Carabi* are particularly active at dusk, I was rather surprised to hear that such is the case with *C. nitens*, since it is only in bright sunshine that I have found this species active on the Donegal mountains. In dull weather I have always found it hiding during daytime in common with other *Carabi*. It is somewhat remarkable that an insect which becomes particularly active in bright sunshine should also become active at dusk. I have only met with *C. nitens* on the upper, uncultivated portions of the hills.

Mr. Johnson's reminder as to sweeping at night is particularly happy at the present time, just at the commencement of the season, and may, I feel sure, be borne in mind profitably by coleopterists in general. Why is it that so many advocate sweeping at night, while so few seem to adopt this method of collecting? Personally, although I am convinced that night-collecting would yield most encouraging results, I must confess that I have never yet tried it on a practical scale, but hope to be able to give a good account of it at the end of the present season.

It is, as Mr. Johnson says, somewhat remarkable that I did not meet with *C. clathratus*; I have no doubt that it exists in the Foyle district. It occurred in the collection of the late Dr. Osborne, of Milford, Co. Donegal, which is now in the Dublin Museum. *Pelophila borealis* also occurred in Dr. Osborne's collection. It is quite possible that I overlooked *Cœlambus v-lineatus*; *C. inæqualis* is certainly abundant everywhere in the Foyle district.

With regard to *Hydroporus Davisii* and *H. septentrionalis*, has Mr. Johnson ever actually observed either of these species rising to the surface for air? I have invariably found these two species at the foot of mountain rivers, in situations devoid of weeds. Being struck with their remarkable habits, I have watched them frequently and long, but have never once seen one rise to the surface, nor in fact rise more than two inches above the river-bed on any occasion. Perhaps further observations on these species may be forthcoming. It is to be presumed that they must occasionally rise to the surface, but they certainly do so at very long intervals.

I must thank the Rev. Mr. Johnson for drawing attention to the previous records of *Mycetoporus nanus* and *Ceuthorrhynchus viduatus*, which I am sorry were overlooked. *Phytosus balticus* I took blowing along the sands at Buncrana, Co. Donegal, near the golf links. It was plentiful on the day when I took it, but I did not meet with it subsequently.

I note that *Philopodon geminatus*, which occurs in great abundance on the sand-hills at Magilligan and Buncrana, varies considerably both in size and colour, but I did not meet with any distinct large white form to which Mr. Johnson refers.

CLAUDE W. BUCKLE.

Chichester.

Additional records of Irish Coleoptera.

In going over my lists in connection with the catalogue of Irish Coleoptera which I am preparing in conjunction with Mr. Halbert, I have found a number of species which I have omitted to record. The object of the present note is to rectify the omission as far as the Geodephaga are concerned:—*Carabus arvensis*, F.—Ardara, in a bag of moss; Newtown-Hamilton, among heather and at the margin of a little stream; all the captures were on high ground. *Bradyellus placidus*, Gyll.—Loughgilly, in moss close to the lake, also among beetles sent to me by Mr. E. R. Curzon from Ballycastle, Co. Antrim. Along with it I received *Pterostichus oblongo-punctatus*, F. *Amara similata*, Gyll.—Armagh. *A. lunicollis*, Schiod.—Newtown-Hamilton, and among beetles sent to me by Rev. S. A. Brennan from Cushendun *A. familiaris*, Duft.—Armagh, Maghera on Lough Neagh, and Newtown-Hamilton. *A. lucida*, Duft.—Armagh and Coolmore. *Anchomenus atratus*, Duft.—Ardara, in moss. *Cilleus lateralis*, Sam.—sent by Mr. Curzon from Waterford. *Bembidium obtusum*, Sturm.—Ardara. *B. æneum*, Germ.—Benburb, among stones on bank of River Blackwater. *B. Clarki*, Daws.—in moss from Scotstown, Co. Monaghan. *B. doris*, Panz.—among stones on Coney Island, Lough Neagh. *B. tibiale*, Duft.—Cushendun, per Rev. S. A. Brennan. *B. femoratum*, Sturm.—Loughgall. *B. bruxellense*, Wesm.—Newtown-Hamilton and Loughgilly; at latter place I took a number under stones on which stacks of corn had rested. *Patrobus assimilis*, Chaud.—Carlingford, Maghera on Lough Neagh, Armagh at Drummanmore Lake, and Ardara; the specimens from the two last localities were by error recorded as *Pterostichus gracilis*, Dej. *Pogonus chalceus*, Marsh.—Greenore. *Lebia chlorocephala*, Hoff.—a single specimen among some beetles sent by Mr. D. C. Campbell from the shores of Lough Swilly.

W. F. JOHNSON.

Poyntzpass.

MOLLUSCS.

Some New Varieties of Irish Land Mollusca.

Some years ago reference was made to a new Irish species of *Pisidium* which had been described by Dr. Westerlund in a paper published in Vienna. The same distinguished conchologist now makes known to us two new varieties of Irish species, but he has gone still further afield this time in his choice of a journal wherein to announce his discoveries to the scientific world.

The descriptions appear in a Russian journal, but luckily he refrains from using the Russian language. They are in Latin, and since the *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St. Petersburg* 1898, is somewhat inaccessible to Irish readers, it may perhaps be as well to reprint the description in full. The specimens were sent to Dr. Westerlund by Dr. Scharff, who had taken the *Succinea Pfeifferi* (*elegans* of British conchologists) at Clondalkin, in the County Dublin. The variety of *Clausilia bidentata* was collected by Mr. R. Welch near Dunluce Church, County Antrim.

Succinea Pfeifferi, var. *reticulata*, West.

Testa oblonga, dense striatula et lineis spiralibus densissimis, tenuissimis at sub lente perdistinctis pulcherrime clathrata, anfracta 3, supremus minimus, secundus convexus, ultimus elongatus, convexiusculus, apertura oblonga, superne acuta, basi rotundata et retusa, duplo quam spira longior.—Long. 12, diam. 4, apert. long. 8 mm.

Clausilia bidentata, var. *variostrata*, West.

Testa ventricosa, spira graciliter attenuata, fusca, ad suturam impressam albidam plus minus crebre maculatim strigillata, anfr. 10-11, superi convexi, inferi planulati, summi laevigati, sequentes 5 et ultimus antice fortiter striati, duo medii densissime striatuli, omnes densissime spiraliter lineati, apertura rhomboideo-piriformis, lamella infera profunda, intus furcata, antice dilatato-abbreviata, plica principalis ultra, lunellam producta, callus palatalis tenuis, coeruleus, plica (callo) basali forti.—Long. 9-10, lat. $2\frac{1}{2}$ - $2\frac{3}{4}$ mm.

Forma sculptura singulari, lamella infera, plica principali producta et colore calli excellens.

Bird Notes from North Tipperary.

I am much obliged for Mr. Ussher's note on the supposed Reed Warbler in the March *Irish Naturalist* (p. 81). I am anxious to obtain the advice and criticism of experienced observers such as he is, and with that object have ventured to contribute a note to this Journal. I hope he and others will help from time to time, and thus make the *Irish Naturalist* specially interesting to students like myself. I am not acquainted with the Garden Warbler, though I had previously heard it nested in a few places near Nenagh. Comparing the description of it and the Reed Warbler in Saunders' "British Birds," it seems to me the bird seen by me last May was much more like the latter than the former.

My acquaintance with our spring migrants is generally made on angling excursions, when I have no means of capturing a specimen. Would it be possible to use a cartridge loaded with small shot in a revolver, or how do collectors bring down their birds? I have landed bats on two occasions when evening fishing, and a swallow in daylight; but a fly rod will not do for birds generally. This district (Ormond Valley, North Tipperary), is well wooded and sheltered, and it appears to be a favourite resting-place for birds in the spring and autumn migrations, and worthy of a naturalist's attention. On looking over Mr. Ussher's paper, "Distribution of Birds Breeding in Ireland," I do not find the Sand Martin mentioned in his lists. He queries the breeding of the Great Crested Grebe in Tipperary. For some years it has been fairly common on Lough Derg, and breeds there. Last year I met it at the mouth of the Nenagh river with young ones, at the edge of the reed beds which line the lake. The Tern and Cormorant are on this lake all spring and summer, and, I am told, breed there. I have often met the Yellow Wagtail on Islandmore and at Luska, Lough Derg, but could

not find its nest. The Jay has lately appeared in Lord Dunally's demesne at Kilboy, near Nenagh.

During the first fortnight of March flocks of Tits, Great Blue, Coal, and Long-tailed, passed here; many of them noisy in song. Apparently there were two kinds of Coal Tits, one with a clear blue-grey back, the other olive green. The blue-backed one appeared stronger and more richly marked on the head. Are they distinct? The large flocks of Thrushes, Redwings, Fieldfares, and Lapwings, which were to be seen in every field up to the middle of last month, have quite disappeared; and numerous Magpies and Reed Buntings arriving with the south-east wind and milder temperature give preliminary warning that the great spring migration is near.

Nenagh.

MICHAEL GLEESON.

Reed Buntings on the Sea-beach.

In my list of "Birds of Dublin Bay," published in Vol. vii., p. 229-239, *Irish Naturalist*, I did not include the Reed Bunting (*Emberiza schanichus*) not having observed it about that locality till this winter, when I noticed it on four occasions.

(1.) January 27, 1900.—Noticed a Reed Bunting hopping about on the edge of a salt water drain close to the Dollymount golf links. Full winter plumage. Sex, male.

(2 and 3.) February 25, 1900,) Noticed a male Reed Bunting on Dolly-
February 28, 1900.) mount strand.

The bird seen on these two dates was in full summer plumage. The deciduary or marginal vernal moult having been completed, the head was jet black, and the ring round the neck a beautiful clean white.

(4.) March 4, 1900.—Noticed another male Reed Bunting in winter plumage on the Dollymount strand.

It is curious that all the records were of male birds, and that one should have appeared in full summer dress at so early a date. The possibility of its being an old male retaining its nuptial plumage throughout the year should not be lost sight of. Do Reed Buntings often frequent the sea-beach?

Trinity College.

CHARLES J. PATTEN.

Nocturnal Habits of Grey Plover.

In the dusk of the winter evenings on many occasions, especially during November and December, I noticed Grey Plover (*Squaterola helvetica*) feeding on the hard ribbed sand uncovered by ebb tide. They were generally noisy at the same time, pouring forth their plaintive cry of alarm. When it became quite dark, and the moon shone out, I could see them still hunting for food. At night they seemed tamer than in daylight, often flying across me at 40 yards distance. I have seen Grey Plover searching as actively for food in the daylight, but generally on soft grass or mud-slob in preference to hard ribbed sand. Do they prefer a change of diet at night? From their constant active habits, it seems these birds require but little sleep.

CHARLES J. PATTEN.

Trinity College, Dublin.

MAMMALS.

New Irish Locality for Leisler's Bat.

In his interesting communication to the *Irish Naturalist* of August, 1899, pp. 169 to 174, and plate 8, Dr. N. H. Alcock showed that Leisler's, or the Hairy-armed Bat, *Pipistrellus Leisleri* (Kaup), is at present known only from the North and middle East of Ireland, and that in the former portion of the country at least it is common.

It would appear that the distribution of this bat in Ireland may be considerably wider than our present knowledge would have led us to infer, for my valued correspondent, Mr. P. W. Finn, sent me for identification from St. Mullin's, Co. Kilkenny, a live specimen (as well as a live *Pipistrelle*), with a letter dated October 21st, 1899. Mr. Finn remarked that "it is a specimen of bat one rarely sees here, the long-eared one being the most common." It appears that this specimen had its home in a deep hole, of which the diameter was about $1\frac{1}{2}$ inches, in the wall of a barn. From this hole Mr. Finn watched it for a fortnight, sallying forth "every evening to the minute at the same time." One day, however, chancing to look up at the hole in the wall, he saw his friend the bat at the edge of its abode asleep in the sun. With the aid of a ladder its capture was easy, and it is now a thriving prisoner in the possession of my friend, Mr. Oldfield Thomas, who reports that it has made a most charming pet, clean, and absolutely devoid of fear. I have myself seen this specimen in captivity, and its habits to some extent agree with those of Mr. Alcock's specimen. Like that specimen it has been taught to come for food on hearing a particular noise. On such occasions it will fly right across a room and alight on the hand that feeds it; but at other times it is averse to flight, and, if made to do so, will simply fly straight across the room and settle on some object on the wall at the opposite end. Its habits in this respect are in striking contrast to those of its fellow-prisoner, the *Pipistrelle* (since dead), which was fond of exercise on the wing, loved to fly in circles around the room for many minutes at a time.

I feel almost sure that Leisler's Bat occurs here also, since, although I have no specimen to produce in evidence, I have on more than one occasion seen bats of a distinctly large size, usually flying in a straight course and at a considerable height from the ground. Thus for about half an hour from 8 p.m. on May 29th, 1898, I watched a large bat flying about in front of the house at a height of about 60 feet or more. After a time it flew away and disappeared over some high trees. It is probable then that, as at St. Mullin's, so here, we have at least three species of bats; at least the distribution of Leisler's Bat may now be regarded as including in its area the whole East of Ireland.

G. E. H. BARRETT-HAMILTON.

Kilmanock, Co. Wexford.

BOTANICAL EXPLORATION IN 1899.

BY R. LLOYD PRAEGER, B.A., M.R.I.A.

(Read before the Dublin Naturalists' Field Club, March 13, 1900.)

OWING partly to the splendid weather of last summer, and partly to the kindness of the Trustees of the National Library in allowing me an extended period of absence, I was able during the season of 1899 to push on rapidly with the exploration of the less known counties, and to add largely to the records already accumulated for "Irish Topographical Botany." About fifty days were spent in the field, and, though much of the time had to be devoted to the compiling of lists of plants (the necessary but hitherto neglected groundwork of local phytogeography), the results were by no means devoid of interest, as the following narrative will show. Owing to the length of the season's work, it is possible only to refer to the various excursions in the briefest possible terms. All picturesque description and general considerations, of whatever interest, have been of necessity cut out; and the residue is little more than an enumeration of plants which are either new to the Districts or counties in which they were found, or which possess some special importance.

The season was a very backward one. A preliminary two-day tramp on May 13-14 from Edgeworthstown to Granard, and thence down the bog-filled valley of the Inny into Mullingar, yielded little of interest except *Lactuca muralis* at Knockdrin, where a glance at Mr. Levinge's papers showed me it was already known to exist. On May 28-29 I went further afield, and, as the guest of Mrs. Frank Joyce at St. Cleran's, S.E. Galway, I had the advantage of her guidance over the interesting limestone country with which, to Irish botanists, her name is associated. The first day, spent about Moyode, yielded new stations for *Neotinea intacta* and *Ophrys muscifera*, and *Viola stagnina* was seen flowering in profusion in the turlough from which Mrs. Joyce has already recorded it. On the second day Knockmae, near Tuam, the most conspicuous hill in N.E. Galway, was visited, and Mrs. Joyce made an important find in *Epipactis violacea*, previously known in Ireland only from the Clare limestones and one station near Cong.

On June 3 I went to Shillelagh and worked across the hills to Tullow. The season was still backward, which was the cause of my gathering *Myosotis collina* in good condition on a wall at Tullow—the second inland station for the species in Ireland, the other being Lough Neagh near Antrim. This formed an interesting addition to the flora of District III. Next day I worked down the picturesque Slaney as far as Ballintemple, getting *Geum intermedium*, *Lathræa squamaria*, *Equisetum hyemale*, and other plants, and back across the hills through Shillelagh to Tinahely, seeing great abundance of *Lastrea spinulosa* in dry woods between these places: in Ireland it usually grows in open boggy ground. Next day I was almost suffocated by heat in the Vale of Ovoca, where I was listing the plants of Avondale.

June 9 to 13 was spent in North-western Ireland, in five counties—one day in each—noting spring plants. The heat was the fiercest that had been experienced for some years, but fortunately I was in a region of lakes and rivers, and refreshed by frequent swims, I averaged 20 miles of walking and 60 of rail per day. With Carrick-on-Shannon as head-quarters I spent the first day in Co. Leitrim, northward of that town. The first plant to catch my eye as I left the railway station (on the Roscommon side of the Shannon), was *Matricaria discoidea*, an alien previously known only from Co. Dublin, but destined to play an important part in the present season's work. The best plant of this day was *Potamogeton filiformis*, which grew in the little lough of Annagheary. The neighbourhood of Leitrim furnished an inland station for *Vicia angustifolia*, unrecorded for District IX. Next day I listed plants in East Mayo, near Ballaghaderreen. *Matricaria discoidea* welcomed me again at the railway station, and further west *Luzula vernalis* turned up in its second station west of the Shannon, an addition to the flora of District IX. The 11th was spent south of Carrick-on-Shannon, among the maze of lakes lying east of Elphin, in Co. Roscommon. A long and very hot time was spent in beating the woods and marshes, and in crossing impossible streams—a couple of feet of flowing water choked with weeds, with a yard of soft mud underneath. The flora was interesting, though in no way remarkable; but on the homeward journey an exhausting

30-mile day was compensated for by the discovery of *Carex axillaris* in its fourth Irish station, the others being Kinsale 1866 (Carroll), Mountmellick 1885 (Hart), and Malahide 1894 (Colgan). It grew here sparingly by the roadside between Grange and Lough Elia, accompanied by both its reputed parents, *C. vulpina* and *C. remota*: *C. muricata* was not present. Next day I left Carrick-on-Shannon, and halting at Collooney, struck eastward along the heathery ridge of metamorphic rock that breaks through the limestone plain between the Ox Mountains and Lough Gill, worked along the Lough Gill shore, and back to Collooney. *Habenaria albid*a on the uplands and *Nicotia Nidus-avis* by the lake were the most noteworthy plants observed. Enniskillen was reached that evening. Next day the heat was so intense that after a few hours' work Mr. Plunkett and I were fairly driven home, and did not venture out again till late in the afternoon, when some work was done on the Lough Erne shores below Ely Lodge.

With this hot spell the flowers of a late spring all vanished, and when I next went afield on June 17 it was full summer. That day I worked down the River Nore from Attanagh to Kilkenny. The stream yielded the running-water form (var. *graminifolius*) of *Potamogeton heterophyllus*, new to District III. Other additions to III. were *Chenopodium Bonus-Henricus*, *Plantago media* (well established on a rough, brambly slope near Lismaine House) and *Lysimachia Nummularia* by the river. Above Ballyragget was gathered *Salix fruticosa* (= *S. aurita* × *viminalis*), a hybrid not previously recorded from Ireland, and *S. triandra*. On old walls both above and below Ballyragget, removed from any garden, *Draba muralis* was gathered in abundance. I had previously found it near Kilkenny (*J. N.*, viii., 88) and I should not be surprised if it proves to be native in this part of the country. An evening train took me to Athy, whence next morning I walked down the Barrow to Levitstown Lock, and thence eastward across the southern end of Co. Kildare, ending up my day at Baltinglass, in Wicklow. *Lysimachia Nummularia* (new to V.) below Athy and *Festuca Myuros* at Baltinglass were the best plants seen.

On June 24 I took up quarters at Nenagh to pursue the exploration of North Tipperary. *Festuca Myuros* and *Lepidium hirtum*, which grew on limestone walls near the town, were new to District VII. ; my now familiar friend *Matricaria discoidea* was here too. These, with *Carex muricata* at Lough Ourna, were the spoils of the short first day—not to mention the really important item, a list of some 300 species. Next morning I struck down the Nenagh River to Lough Derg. *Crepis biennis* and *Dipsacus sylvestris* put in an appearance near River View—the former very abundant in this neighbourhood, the latter new to District VII. The shores of Lough Derg were examined from Dromineer to the end of Youghal Bay. *Geranium columbinum* appeared native on limestone rocks near Shannonvale. On the north shore of Youghal Bay *Inula salicina* was found. This is the most southerly station yet known for this rarity, and I doubt if it will be found further south on Lough Derg, as the limestone here gives way to the inhospitable Old Red Sandstone. Below Youghal grew *Enanthe crocata*, unrecorded for District VII., and *Stellaria palustris*. The Teazel turned up again ; also *Matricaria Chamomilla*, new to VII., but hardly established here. Next day I struck south over the low ground to Silvermines, under a threatening sky. The Silvermines Mountains were crossed in drenching mist, and by the time I got down into the grand glen of the Mulkear River it was evident that it was hopeless to attempt work on the high grounds of Keeper, which towered up into the driving clouds, so I worked down stream. Additional stations for *Enanthe crocata* and *Lepidium hirtum* were found. The clouds rose as I cleared the mountains, and I worked across to Killaloe, where *Petasites fragrans*, unrecorded for VII., was seen ; also *Festuca Myuros* in both Tipperary and Clare. A rapid reconnoitring of the Arra Mountains and an evening walk to Birdhill brought a 30-mile day to a conclusion. Early next morning I travelled to Athlone to join the Dublin Field Club. Some account of our three days' work there has already appeared in these pages.

I was back in Athlone on July 2, and spent a day in the poor country lying to the westward—in Co. Roscommon. Four of the plants noted were new to District IX. :—*Viola odorata*, looking wild on banks near Athlone ; *Valerianella olitoria*,

near Athlone; *Cauculis nodosa*, among the ruins of Castle Sampson; and †*Mentha piperata* on the site of Corkip Lough. The railway tracks some miles west of Athlone yielded *Diplotaxis muralis* and *Arenaria tenuifolia*, and, of course, abundance of *Linaria viscida*; close to Athlone *Matricaria discoidea* began, and almost monopolised the space. The same group of plants, minus *Diplotaxis*, grow on the railway east of Athlone (Co. Westmeath). Taking train next morning to Mullingar, the first plant seen was *Matricaria discoidea* again, swarming about the railway and over the adjoining roadway to the canal banks. Six miles of canal to the west of Mullingar yielded little, and I turned northward to Lough Owel, and thence to Lough Iron. Lough Iron does not appear to have been explored by Mr. Levinge, and its southern end yielded a good marsh flora, including *Lathyrus palustris*, *Cicuta virosa*, *Galium uliginosum*, &c. The River Inny, between L. Iron and Ballinalack, yielded some peculiar plants, including a large pondweed still unnamed, and a sedge which most resembles *C. aquatilis*. I now struck across country towards Lough Deravaragh. For some years past I have noticed when passing in the train a large patch of what I felt certain was *Typha angustifolia* growing in the Inny below the railway bridge. An opportunity was now afforded of confirming my diagnosis, and I was much pleased to find that my surmise was correct. Excepting the recently discovered station in Kilkenny (*I.N.*, viii., 11) this plant was known to grow only in Ulster. The new station furnishes a connecting link between the northern and southern localities. It was now late, and I caught the train for Dublin at Inny Junction. My next trip was to Co. Waterford. July 7 found me established at Dungarvan, which may be the dirtiest town in Ireland, as stated in one of Mr. Hart's papers, but possesses one of the cleanest hotels. The first day was devoted to listing plants in the near vicinity. The following morning I turned my steps eastward along the coast. About Abbeyside, *Rumex pulcher* grows in some quantity. Excepting its casual occurrences about Dublin, this plant was previously known only from Co. Cork. It was accompanied here by *Raphanus maritimus*. Clonea marsh, which has been described by Mr. Hart in his "Flora of the Wexford and Waterford

Coasts," next claimed attention, and yielded two interesting plants which apparently escaped the keen eye of that observer—*Osmunda regalis*, growing in grand tussocks amid a jungle of reeds and willows, and *Pinguicula lusitanica*, here only a few feet above sea-level. A long day was spent on the grand cliffs from Ballyvoyle to Bunmahon, and thence up the Mahon River to Kilmacthomas.

Next morning I started work at Lismore, explored the fine wooded glen there, and worked down the Blackwater to some miles below Cappoquin. *Potamogeton nitens*, new to District II., is plentiful in the river. On the banks above Cappoquin I gathered a peculiar *Nasturtium*, which Mr. Bennett names *N. barbarædes*, Tausch, = *N. amphibium* × *sylvestre*. As both parents are known to grow about this portion of the Blackwater, the occurrence of the hybrid is not unlikely. A plant which is apparently the same, though unfortunately immature, I had previously gathered by the Shannon, on the Leitrim bank below Carrick. As *N. sylvestre* is one of our rarest Irish plants, and according to our present knowledge confined to the Blackwater, Nore, Barrow and Erne, its extension to the Shannon basin would be important, and I trust that some botanist will take the hint supplied by the hybrid, and search for it there. In the salt marsh below Cappoquin *Cerastium holostoides*, Fries, a giant variety of *C. triviale*, was found in its second Irish station. About Cappoquin, and indeed at every town I visited in Waterford, *Festuca Myuros* grew. It is a grass that has been overlooked in many districts of Ireland. Heavy rain overtook me on my way to Cappagh. I gathered *Galium Mollugo* on the railway bank there, and succeeded in turning up one or two calcicole species on the limestone—*Orchis pyramidalis* and *Geranium lucidum*. But the limestone valley of the Blackwater is so choked with non-calcareous debris from the hills on either side that the calcicole flora of Co. Waterford is reduced to some half dozen species. Thoroughly soaked, I took train at Cappagh for Dungarvan. A 6-o'clock start next morning enabled me to skirt round Dungarvan Harbour and examine the Conigar before taking the morning train to Dublin. The Conigar is a strange sand-bank $1\frac{1}{2}$ miles long and often only a stonethrow wide, which almost cuts Dungarvan Harbour in two. *Cuscuta Epithymum*

and *Juncus acutus*, both recorded from here, were gathered, and other plants less rare, but more useful for my lists.

On July 13 I went to Tuam for five days' work in Co. Galway. In the afternoon I worked over Knockroe, a low but conspicuous hill in this featureless country, past Moyne Abbey, and northward to the Grange River. In a marsh east of the stream, three-quarters of a mile north of Barbersfort, I got a sedge which, thrown off my guard by its inland habitat, I did not recognize as the familiar sea-side *C. distans* till Mr. Bennett named it for me. The only other inland locality I know of in Ireland is Cleenishgarve, on Lough Erne (*I.N.*, i., 113) which is omitted in *Cybele*. Splashing through the Grange River in the dusk at the ruined corn-mill above Barbersfort, my eye caught a small pondweed growing on the gravelly bottom of the shallow rapid stream, which I recognized as the rare endemic *P. lanccolatus*, a diagnosis confirmed by Mr. A. Bennett, who remarks that it is the same large-leaved form which I sent him from Clonbrock (*I.N.*, v., 243), and for which he suggested the name var. *hibernicus*. The only other Irish station for the species is in Clare, and, so far, a 25-mile radius will include its known localities in this island. Elsewhere, it is known only from Anglesea and Cambridgeshire.

On July 14 a long loop was made for the exploration of several lakes lying to the northward of Tuam. Not far from the town *Lamium intermedium*, new to District VI., was gathered. The Clare river below Weir Bridge yielded a number of interesting plants, of which the conspicuous var. *Moorei* of *Apium inundatum* was unknown outside Ulster, and *Carex acuta* was unrecorded for District VI. On the edge of the bog here *Carex distans* was gathered again. A wet patch of bog lying half a mile east of Killower Lough yielded a group of good plants—*Lobelia Dortmanna*, *Eriocaulon septangulare*, *Rhynchospora fusca*, *Carex limosa*, growing amid an abundance of all three *Droseras*. This is an important extension of range for the Pipewort. It was unknown east of Lough Corrib, and the line showing its limit on the map in *Cybele* must now be shifted 15 miles further inland. Both it and *Lobelia* looked strangely out of place on this low-lying limestone country. The rest of this day, though highly interesting, calls for no special comment.

Next morning I sent my traps to Oughterard by rail, and struck south-westward from Tuam. *Mentha piperata*, looking wild a few miles out, is unrecorded for District VI. Further on, characteristic plants of the limestone "crag" became conspicuous—*Asperula cynanchica*, *Galium sylvestre*, &c. I struck Lough Corrib at the head of its long eastern arm, and spent the day in working along its shores to Kilbeg. When I had gone a short distance, an excellent piece of rough limestone ground was met with due south of Luinnagh (see 1" O.S. maps, 95 and 105). Here *Geranium sanguineum*, *Rubia*, *Thalictrum collinum*, *Gentiana verna*, *Galium sylvestre*, &c., were abundant. Close to the lake grew *Equisetum variegatum*; and best of all, on a stony knoll, *Neotinea intacta*, now in fruit. The headquarters of this rare orchid are on the Burren limestones, where it is frequent over an area extending from near Athenry to Castle Taylor, and thence westward to the Atlantic. Outside this continuous area, the only known station was near Cong, where Dr. Moore found it many years ago. My pleasure at discovering a connecting link between these widely separated localities may be imagined. The failing light compelled me to turn back at Clydagh to Kilbeg Ferry, and it was dusk ere I touched the Connemara shore. While waiting for a car to take me to Oughterard, I added *Matricaria Chamomilla* to the flora of District VIII., found *Calamintha officinalis*, and also *Pimpinella magna*, which kept me company, in profusion, for many miles as I drove westward. The following day I devoted to listing Connemara plants, working along Lough Corrib and up the beautiful western arm, and back by Lough Bofin. On the Corrib shore below Newvillage bridge a very unexpected find was made in *Carex extensa*. This is a characteristic sea-coast plant, and the only inland station recorded for it in the British Isles appears to be that in Leighton's *Flora of Shropshire*, which is now doubted, as no specimens exist, and the species has not been rediscovered. Abroad, the only inland stations I can discover are in North Italy, where it occurs occasionally quite inland—"rara nella parte settentrionale ove si trova anche a qualche distanza dal mare" (Parlatore: *Flora Italiana*, ii., 207)—as at Bobbio for example. The occurrence in western Ireland of maritime plants in inland situations is a very interesting point, and

clearly requires further observation. The rest of the day, spent amid delightful scenery, and surrounded by the fascinating flora of Connemara, need not be enlarged on here. About the railway west of Oughterard an interesting group of plants turned up—*Arenaria tenuifolia*, *Filago germanica*, *F. minima*, and *Scleranthus annuus*, all in some abundance. The first is becoming a notorious railway denizen, but the others are native plants, and the last two distinctly calcifuge in their distribution: and as local material only was used in making the line, I am inclined to treat them as indigenous here; they probably spread to this tempting open ground from other stations in the vicinity. The *Arenaria* and *Scleranthus* have no previous record from District VIII. On my last day I started from Moycullen, and worked along the chain of lakelets to Ross Lake, thence eastward to Lough Corrib, and along its shore to Kilbeg Ferry, and back to Oughterard. This is the strangest country I have seen in Ireland. It lies on the very verge of the great limestone plain, where the latter runs up against the ancient highlands of Connemara. Wide bogs, the flora of which recalls Connemara rather than the limestone plain, in the apparent absence of *Vaccinium Oxycoccus* and *Andromeda polifolia*, are interspersed with stony esker-like limestone ridges thick with boulders, on which grow *Geranium sanguineum*, *Arctostaphylos Uva-ursi*, *Juniperus nana*, *Asperula cynanchica*, *Gentiana verna*, and other characteristic plants of what we may conveniently term the Burren flora. With them *Erica cinerea*, usually reckoned as a confirmed lime-hater, grows in plenty—the only time I have ever seen it on limestone. Rising abruptly out of the bogs are plateaus of limestone, their level tops sometimes composed of bare “craggs” with their peculiar flora, more often covered with a low growth of hazel and briars so dense that for the first time in Ireland I found myself absolutely compelled to abandon my line of march. After half an hour spent in struggling along, slipping on the smooth and deeply crevassed rock, and pushing a way by sheer force through the dense tangle, I thought myself fortunate in emerging, with clothes, face and hands considerably damaged, not at the opposite side of the thicket, but close to the point where I had entered it. To return to the rarer plants—*Ononis arvensis* and ‡*Cichorium Intybus* at Moycullen, and *Euphorbia*

exigua at Ross Lake, were additions to District VIII. ; a more interesting addition was *Epipactis palustris*, which grew in glorious profusion on the lake-shore all round Annagh Wood. Best of all, *Neotinea intacta* turned up again on limestone mounds about Ross Lake and for a couple of miles north-westward, forming another connecting link between its northern and southern stations. I have little doubt that it will eventually be shown to occur throughout the limestone region stretching from Lisdoonvarna in Clare around Galway Bay and along the chain of lakes to Lough Carra in Mayo. *Potamogeton nitens* grew in Ross Lake, and *Ophrys muscifera* on ridges in the bogs between that and Gortmore, where I struck Lough Corrib. Several islets were explored by swimming as I worked northward, but the rest of the day was comparatively uneventful.

The next trip was to Co. Leitrim. July 21 was spent in the district around Drumod—a curious country, consisting of parallel low ridges and hollows, the former tilled, the latter filled with bog or lake. On the bogs *Rhynchospora fusca* was abundant—a considerable northward extension of its range—and *Drosera intermedia* occurred. Rinn Lough yielded among other things *Stellaria palustris* and *Cicuta virosa*. A late train brought me to Ballysodare, whence an early start enabled me to reach Manorhamilton by breakfast-time, and I was soon off on foot for Bundoran via Glenade. In a wood by the roadside north of Lurganboy I had the good fortune to get the beautiful *Pyrola minor*. Previous records consist of a single station in Wicklow, two in Westmeath, and a number in the North-eastern province (Down, Antrim, Derry). A rayless form of *Senecio aquaticus*, corresponding to var. *flosculosus* of *S. Jacobæa*, was gathered here on the roadside. Willows are very abundant in Glenade, *S. pentandra*, *S. purpurea*, and *S. Cuprea* being conspicuous. By the road I also gathered *Polygonum Mite*, for the second time in Ireland, the other station being Lough Ramor in Co. Cavan. I botanised round Glenade Lough, and spent a few delightful hours on the huge cliffs which overlook it, amid the profusion of alpine plants for which they are famous. The fine specimens of *Polygala grandiflora* and *Polystichum Lonchitis* were particularly pleasing. Crossing the valley I ascended the less attractive cliff-walled mountain

(1,487 feet) over Larydonnell, and thence dropped down into the low ground which stretches to the Atlantic. At Uragh Lough *Rhynchospora fusca* turned up again in profusion, far beyond its most northerly recorded station, with *Drosera intermedia* and other western plants. A swim in the dusk at Bundoran concluded the day's work. I was off early next morning through Kinlough and along the shores of Lough Melvin. These proved rather uninteresting. *Salix fragilis*, looking wild on the lake shore, is unrecorded for IX. In the S.W. corner of the lough, near the mouth of the Ballagh River, *Potamogeton filiformis* was a welcome find, and *P. Zizii*, which I swam for at Ross Point, is new to District IX. From Lough Melvin through the mountains to Manorhamilton nothing special turned up. Next morning I was on the Leitrim shore of Lough Gill, *via* Dromahaire, at 9 o'clock. The scenery here is exquisite, and the botany of no mean order of interest. Limestone bluffs overhang the lake, on which *Taxus* and *Cornus sanguinea* are native, and *Orobanche Hederæ* grows freely. In a deep glade *Agrimonia odorata* was in profusion, and it was seen several times later in the day. By the Bonet River *Lysimachia Nummularia* was abundant. In Dromahaire, on the way back, *Sisymbrium Thalianum*, unrecorded for IX., was gathered, and train was taken for Dublin.

Three days were spent in Carlow on July 29-31. The weather had again become intensely hot, which made field-work very arduous. Commencing operations in Borris demesne, *Lysimachia Nummularia* and *Agrimonia odorata*, growing in profusion in wild ground by the Barrow, were added to the flora of District III.; with them were *Salix triandra* and *Carex Pseudo-cyperus*. Working up stream, a high gravelly bank yielded *Erigeron acre*, *Valerianella Auricula*, and *Geranium columbinum*. *Potamogeton flabellatus* and *P. heterophyllus* var. *graminifolius*, are common Barrow pondweeds, though hitherto unrecorded for III. Further up *Cynoglossum officinale* appeared in one of its rare inland stations. Near Goresbridge I gathered *Polygonum maculatum* ("β. *densum* f. *incanum*"—A. Bennett), also new to III. Thence I cut across to the railway and confirmed a station for *Equisetum hyemale*, seen from the train on my journey down. Next day I tramped southward many miles along the railway, and thence to the

base of Blackstairs, where *Radiola linoides* (new to III.), *Anthemis nobilis*, *Filago minima*, &c., grew. Blackstairs was ascended in sweltering heat, and thence in the cool of the evening the lowlands were crossed to Borris. On the 31st I worked from Carlow along the limestone country west of the Barrow to Bagnalstown, and added some calcicole species to the Carlow flora. *Galeopsis angustifolia* was, perhaps, the best plant seen.

The weather was hotter than ever when I reached Waterford on the night of August 11. The country was parched, and the landscape danced in the pitiless heat. A start at 6 a.m. appeared the best chance of doing any work, and I got away from Mullinavat eastward, beat some moory ground covered with delicious tart cranberries, and striking south ascended Tory Hill, a conspicuous conical peak of Old Red conglomerate. On its southern flanks *Agrimonia odorata* and *Linum angustifolium* were observed, and by the stream at Catsrock Bridge fine tufts of *Osmunda*, now very rare in Carlow. I revisited Lough Cullin without adding anything remarkable to its flora, and struck south-eastward across country for Ballinlaw Ferry, on the tidal Barrow. *Agrimonia odorata* again appeared near the river. I worked down the Barrow and up the Suir to the mill above Snowhill with good results, and need only mention here plants additional to the notes published by Mr. Barrett-Hamilton on the flora of the neighbourhood (*Journ. Bot.*, xxvii., 7; xxviii., 88.) At Ballinlaw *Beta maritima*, and at Snowhill *Spergularia media* and *Zostera marina* represented additions to the District III. flora. Two much more interesting additions were, however, made. *Corydalis claviculata* grew plentifully on a high rocky bluff overhanging the river below Ballinlaw, and, curiously enough, splendid specimens in full flower were obtained in this scorching mid-August. Lower down, on rocks overhung by trees on the beach, the beautiful variety *acutum* of *Asplenium Adiantum-nigrum* grew with the type, in luxuriance rivalling its Killarney home. The trees here hang far over the water, and their lower branches are draped with seaweed, just as the Florida trees are hung with pendent grey lichen. Waterford was reached at 10 p.m. Next day I went early to Tramore. A visit was paid to the far end of the remarkable isthmus from which the place derives its name in order to study the

question of the nativity of *Brachypodium pinnatum* in its only Irish station ; and I may at once say that I agree with its discoverer, Mr. Phillips (*I.N.*, vii., 253), in admitting it without reserve to our indigenous flora. Coming back over the salt-marshes which lie behind the beach, *Erythræa pulchella* was found in great profusion over a wide area ; *Trifolium fragiferum* and *Suaeda* were with it, and many other halophytes. The drier grounds near Tramore yielded *Agrimonia odorata*, *Linaria Elatine*, *Linum angustifolium*. Striking inland to the westward, a group of rocky hills was visited which embosom two little lakelets, which, with one other near Dunmore, constitute the only standing water in the whole County of Waterford. The larger of the two, Ballyscanlan Lough, is deep and clear, and yielded *Isoetes lacustris*, in addition to *Lobelia Dortmanna* already recorded from here. Both species of *Scutellaria* and other marsh plants grew by the margin. A terribly hot tramp brought me northward to Mount Congreve, where once again *Agrimonia odorata* was noted. Here it grew abundantly along the roadside banks, mixed with *A. Eupatoria*, affording a very pretty study in the specific characters of the two. From Mount Congreve to Waterford the Suir proved uninteresting—a continuous mud-bank fringed with a forest of reeds. Now for the first time the heat of this tropical summer was fairly too much for me, and I retired ingloriously home.

I was on the tramp again on August 24, when five days were devoted to East Galway. The weather was cool and showery, a delightful contrast to previous experiences, and I averaged twelve hours in the field and twenty-five miles of walking per day for the ensuing week. My principal object was to carefully list the maritime flora of Galway Bay, an almost unworked region. On the first day I worked from Oranmore to Galway, along the only bit of coast-line which N.E. Galway possesses. The poverty of the maritime flora of the West compared with the East was steadily forced upon my attention all day. The most interesting plants seen were *Glaucium flavum* and *Chenopodium rubrum*. *Dipsacus* occurred on dry banks, and *Solanum nigrum* and *Hyoscyamus* in some abundance on the beach east of Galway. From Galway I went N.E. along the course of the remarkable Terryland River, which, reversing the usual order of things, flows *out of* the

River Corrib, meanders along a valley for a few miles, and vanishes abruptly under a rocky hill. The modest twisted flower-spikes of *Spiranthes autumnalis*, with their delicious fragrance, accompanied me everywhere. A five-mile gallop on a rough dusty road in a cart without springs, accompanied by wild yells in our beloved Irish tongue, brought me in a somewhat breathless condition back to Oranmore.

The coastline of the upper end of Galway Bay, between Oran and Kinvarra, is broken by long peninsulas and inlets, like the teeth of a comb, so that the twelve miles between the points named is increased to fifty if one follows the shore. The coast is low, bare, and inhospitable, excessively stony, and devoid of sand or shingle beaches; and so tangled are the land and sea that one hardly ever gets a glimpse into the open bay. I devoted two days to the exploration of this totally unknown region, working half way down the coast and on into Kinvarra by road on the 25th, and next day working up the other half of the coast and into Oran by road. Even omitting a number of long promontories, this gave close on thirty miles of rough walking each day. The results were poor, but not disappointing. The most remarkable plant of the region is *Artemisia maritima*, which first put in an appearance near Kilcaimin, and throughout my two days re-appeared in profusion at frequent intervals from there all the way to Kinvarra. Indeed, it is no exaggeration to say that there is more of this rare plant on that bit of coast than in all the rest of Ireland put together. The only Galway record for the plant is one from Carranroe, just on the border of Clare. *Polygonum Raii*, near Ardfry, was the only other uncommon maritime plant noted. On the first day, after leaving the coast, I struck a delightful piece of ground at Esker Lough, lying remote amidst a great tract of limestone pavement or "craggs." The lake is a mile long, quite straight, and only 50 to 100 yardswide. Except in wet weather it is filled not with water, but with a level deposit of cream-coloured limy mud, hard enough to walk on. Bushes of *Rhamnus catharticus* and *Cornus sanguinea* rise along the margin, and tall clusters of *Lastrea Thelypteris*; the adjoining rocky slopes are covered with sheets of *Arctostaphylos* and *Dryas*, and a search revealed the fruit-stems of *Neotinea* and of *Gentiana verna*. Heavy rain and failing

light compelled me to beat a retreat here, and I was soaked through when I reached Kinvarra, where grew *Linaria Cymbalaria*, unrecorded for District VI. The features of the return journey are summed up in the abundance of *Artemisia maritima* and of the delicious *Spiranthes autumnalis*. The 27th was spent listing seaside plants in W. Galway, from Galway to Barna. Several plants unrecorded for District VIII. were noted—*Sagina apetala*, at Salthill¹; *Myriophyllum spicatum*, at Galway Docks; *Carduus pycnocephalus*, at Galway and Gention Hill; *Linaria Cymbalaria*, at Galway; *Ruppia rostellata*, at Gention Hill. Searching the gravelly promontary opposite Barna House I was interested to find that the alpine-calcicole flora for which Gention Hill is famous—*Gentiana verna*, *Juniperus nana*, *Dryas octopetala*, &c.—extends to this place. On my last day in Galway I worked up the Corrib along the east bank. The rare *Lemna polyrrhiza* in ditches at Menlo was, perhaps, the best plant found. The great flats where Lough Corrib narrows into the river yielded nothing uncommon. In a ditch near Carrowbrowne a very pretty form of *Potamogeton heterophyllus*, unrecorded for VI., was abundant. Thence I made a wide semicircle over rather featureless inland country to Oranmore.

That evening I shifted headquarters to Athlone, and next day worked across through Clara to Tullamore, in King's Co. About Clara grew *Peucedanum sativum* (abundant on an esker), *Polygonum lapathifolium*, and *Festuca Myuros*, all unrecorded for VII., and my old friend, *Matricaria discoidea*, formed a close mat on the fair-green. The 30th was spent in Westmeath, between Athlone and Moate, listing late plants. *Centaurea Scabiosa* and *Carex acuta* near Glynwood House, and †*Matricaria Chamomilla* on an esker north of Moate, represented additions to the flora of VII. The last day of the season, August 31, was cold and showery, and I spent a quite uneventful day in Roscommon, about Ballinasloe. The most promising plant gathered was a Burdock, which I suspected to be *A. majus*. Mr. Bennett shares my suspicions, but also my lack of certainty. Thus ended my field-work in 1899.

National Library, Dublin.

¹A station in VIII. is given by Mr. Colgan in last month's issue.

THE CROOKEDNESS IN THE STERNA OF CERTAIN BREEDS OF DOMESTIC FOWLS.

BY PROF. R. J. ANDERSON, M.D.

ORDINARY Barn-door Fowls have usually sterna with straight keels, and the tail bones are set commonly in the same vertical plane as that in which the vertebral column is situated. Crooked keels are very common amongst the pure breeds. What is the cause of the asymmetry? The nature of the roosts, the early roosting of the birds, the nature of the breed, the weight of the birds, the proximity of the roosts to the walls of the fowl house, the state of health of the birds due to the season or the time of hatching, or to the presence or absence of certain substances such as lime in the food, or want of iron, or a rickety condition of the skeleton, due to close interbreeding, may have an effect. Animals in our own climate are much subjected to unnatural conditions (too little fresh air and too much moisture are often causes of unhealth); it is necessary to take account of such factors in attempting to ascertain the cause of the anomalies such as the skeleton presents. It is also necessary to take note of the fact that the isolation of certain breeds means more than the separation of birds having certain colours or great local growths of feathers or grotesque wattles. The cultivation of a colourless or white breed of fowl may mean the perpetuation of an imperfectly pigmented nervous system, and although pigment and lime do not appear to be necessary to each other, it would seem that phosphates and phosphoretted fats promote the efficiency of the nervous system. The increased growth of wattles or feathers is also associated with activities of another kind, which, if the skeleton do not experience a corresponding increase in vigour, may actually lead to a weakening of the bones. C. Darwin showed long ago how the skeleton varied in rabbits, &c., under domestica-

tion, and Ray Lankester has pointed out how a tissue of high potential value may, in vanishing, afford food for the manufacture of more massive tissues less highly organized. Hence one must exercise much caution in coming to a conclusion with reference to the real origin of the deformities in fowls. The following breeds of fowl were kept separate for some years:—Minorcas, Leghorns, Plymouth Rocks, Brahmas, and Spanish Blacks. Two Leghorns showed wry tails; all the others were free from any marked deformity of this kind. Crooked-keeled sterna were, however, frequent. The most crooked keel of those preserved by me belonged to a Brahma. The keel where the bend is greatest is almost horizontal. There are marks of pressure in some cases. A broadening of the edge is perceptible in two keels bent to the right and in four bent to the left. An indentation occurs in front of the middle of two sternal keels bent to the left. Two keels have marks of being broken and reunited. The bend of the keel is to the left in nine cases out of fifteen, and in six keels to the right. The keels are sometimes crooked in water-fowl which do not roost. There is a note to the effect that a "Black Norfolk Turkey" with a crooked breast was mated with a straight-breasted hen. The roosts were low and flat, the reporter goes on to say, five male birds out of sixteen had crooked breasts. The separate flocks referred to above were allowed to intermingle after some years, with the result that the crooked keels diminished in number. Guinea-fowls seem not to follow the lines of the ordinary domestic fowl. Those under observation at present have straight keels although they are the fifth generation from a common stock. It is possible that the original eggs were not laid by the same bird.

The table herewith appended contains the answers of some of the best known English fancy-fowl breeders to a series of questions I sent round. The answers and foregoing records seem to show that (1) in-and-in breeding, (2) the nature of the roosts, (3) the nature of the season, (4) early hatching, (5) defective food and cold may all contribute to produce variations, and may rank among the predisposing, congenital, exciting, and concomitant causes of the anomalies.

THE CAUSE OF DEFORMITY OF THE KEELS OF THE STERNA,
AND OF WRY TAILS IN FOWLS.

Replies of twelve English Breeders of Pure-bred Fancy Fowls.

No. of Reply.	Question 1—Are crooked keels due to roosting?	Question 2—May crooked keels or wry tails be due to in-and-in breeding?	Question 3—Are such defects hereditary?
1	Yes, . . .	No, . . .	No.
2	Yes, . . .	Crooked keels are. Wry tails not.	May be, but crooked keeled birds have offsprings with straight breasts.
3	Yes, . . .	Partly, . . .	Yes, if not acquired. If acquired, not transmissible.
4	No, . . .	Yes, constitutional,	Yes.
5	Yes, . . .	No, . . .	No.
6	Yes, . . .	Sometimes, . . .	May be.
7	Sometimes, . . .	Contributory, . . .	Sometimes.
8	Due to roosts, . . .	Contributory, . . .	Yes
9	Early roosting may contribute.	Cannot offer an opinion.	Wry tails are.
10	Due to roosts, . . .	Crooked keels not, but wry tails are .	Yes.
11	Due to perching too early. Wry tails due to perches placed too close to back wall.	Yes, partly, . . .	No.
12	Early roosting, or round perches.	No, . . .	No.

Queen's College, Galway.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Markhor, and a Urial from Lord Roberts, a number of Gold-fish from Mr. H. Pim, three Japanese Fowl from Mrs. C. B. Marlay, a number of small birds from Master Despard, a Golden Pheasant from Mr. W. J. Williams, a Common Pheasant from Captain J. Carroll, a Black Rat from Dr. H. FitzGibbon, a pair of Pigeons from Mr. C. MacNaughten. Eleven hybrid colts, between Horse and Zebra, were most kindly lent to the Gardens by Professor Ewart of Edinburgh. A Bactrian Camel has been born in the Gardens. A Genet, a Suricate, a Hairy Armadillo, two Californian Quails, six Parrakeets, and a Rock Mynah have been bought.

26,322 persons visited the Gardens during April.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 3.—Under the chairmanship of Mr. ROBERT YOUNG, C.E., Vice-President, a paper, entitled "Some of the Work done by Committees of the British Association," was read by Professor M. F. FITZGERALD, B.A., M.I.C.E. In the course of his lecture the Professor said the real and permanent value of the Association lay largely in the work not done at the conferences, but elsewhere during the intervals between. Since its inauguration the Association had granted about £64,400 for the furtherance of inquiries of great public importance, while the eminent scientists connected with it had freely granted their services. Everywhere the practical men of the world had to turn to the theoretical men for their ideas and opinions. Through the efforts of the Association Committees research and experiments of extreme importance had been carried out in regard to electrical standards, steam navigation, steamship performances, strength of iron and steel, requirements of provincial museums, systems of teaching, inspection of elementary schools, chemical subjects of a wide range, and numerous other matters; while at present a committee was engaged in testing what dyes were fast and what fugitive. The influence of the Association in national matters had not been by any means a negligible quantity, and had brought about many reforms. It was by neglect of the advice of the Association that many serious disasters occurred. The Association had placed before the Board of Trade the necessary data for the framing of regulations on various subjects at one-twentieth the cost which would otherwise have been involved. At the conclusion of the paper, on the proposition of Mr John Brown, seconded by Mr. C. M. Cunningham, a hearty vote of thanks was accorded Professor Fitzgerald. Subsequently, through the courtesy of Mr. E. A. MacGeorge, J.P., the members had an opportunity of inspecting a large bomb found recently at a depth of eight feet in estaurine clay convenient to the Scottish Provident Buildings, Wellington-place.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 20.—The Vice-President (Mr. F. J. Bigger) in the chair. During the usual half-hour "gossip" Mr. H. L. Orr exhibited the result of his examination of a portion of ordinary wild land, measuring only 3 feet by 2 feet, from which he collected, on the 18th February, 38 beetles, comprising 21 species—1 isopod crustacean, 6 ichneumons of one species, a moth, a butterfly, 23 shells of seven species, 2 species of spider, and a mite. Mr. Hamilton exhibited some fine Lias fossils, and Mr. Gray some foliated crystals of iron pyrites from Co. Down.

At the formal meeting, held at eight o'clock, Miss S. M. THOMPSON contributed a paper on "The supposed occurrence of a patch of White Lias rock on the shore north of Macedon Point." This portion of the shore of Belfast Lough was formerly covered with sand and shingle, which were removed by spring storms, exposing the rock that attracted Miss Thompson's attention, who considered the rock belonged to the Rhætic beds, and not to the Bunter division of the New Red Sandstone, as mapped by the Geological Survey. Miss Thompson consulted Professor Cole, and submitted specimens to Mr. M'Henry, of the Geological Survey. Both gentlemen admitted the resemblance of the rock to the beds at Waterloo, near Larne, and justified Miss Thompson's provisional identification.

The next paper submitted was from Canon H. W. LETT, on the occurrence of Natterer's Bat and the Whiskered Bat in Co. Down. The former he captured at Aghaderg Glebe in June, 1897, and at the same place, in March, 1899, he secured a specimen of the Whiskered Bat, which, as in the case of Natterer's Bat, had not previously been recorded from the Co. Down. The paper furnished interesting details with reference to the character and distribution of all the known species of Irish bats. During the discussion that followed Mr. R. Patterson exhibited a specimen of the Whiskered Bat, captured by him at Dromore in July, 1899.

Mr. JOSEPH WRIGHT, F.G.S., delivered a lecture on "Post-Tertiary Foraminifera." The results of his labours tend to modify hitherto accepted theories in reference to the origin of Boulder-clay, and the results obtained within the area of the Field Club's investigations have been confirmed by examples sent him for investigation by the Duke of Argyll, Dr. Dawson, of Canada; Mr. Neilson, Scotland; Miss Andrews, Wales; Rev. Maxwell Close, Wicklow; I. Smith, Ayrshire; Colonel Feilden, Novaya Zemlya, and many other contributors and correspondents. The careful research necessary in the examination of these beautiful but minute organisms may be guessed when it is considered that a specimen of clay supplied by Mr. Gray, from Bovevagh, Co. Derry, which weighed only 4½ lbs., yielded 57 species, of which there were 43,000 specimens, which were so small that 100,000 could be placed on a sixpence. Each communication was discussed, and after the election of members the meeting was closed by the Chairman reading an invitation from W. F. de V. Kane, D.L., to the Club to visit Co. Monaghan during the coming summer excursions.

APRIL, 6.—COMPLIMENT TO MR. JOHN VINYCOMB, M.R.I.A.—Some of Mr. Vinycomb's friends, having learned that there was a likelihood of his soon leaving Belfast for London, took the opportunity of presenting him and Mrs. Vinycomb with valuable expressions of their respect and sympathy.

It was moved by Mr. Francis J. Bigger that the chair be taken by Mr. Adam Speers, B.Sc., who, in his opening remarks, said that he had had the privilege of long intimacy with Mr. Vinycomb. Mr. Vinycomb was not only an artist unequalled in those departments he had made his own, but he was a literary man as well—a rather rare combination—of which his valuable contributions to *Ex Libris*, *Sphragistics*, *Archæology*, and *Heraldry* (in which he is recognised as one of the first authorities) gave ample proof. His genius and worth were best known to those who held the highest places in the departments of art, literature, and science in which he had specialised.

After the Chairman's remarks, the meeting was addressed by Messrs John M. Dickson, Joseph Wright, J. J. Phillips, John Stevenson, S. Shannon Millen, B.L.; and William Gray, all of whom spoke in terms of warmest admiration of Mr. Vinycomb's genius and of his life-work in Belfast.

The Chairman then presented to Mr. Vinycomb a purse containing 100 guineas, and to Mrs. Vinycomb two magnificent silver candelabra.

Mr. Vinycomb, replying on behalf of himself and his wife, said that he was quite unable to give adequate expression to what he felt. He was most grateful for all their kindness, and his earnest desire should ever be to merit their esteem.

APRIL, 12.—MR. J. M. DICKSON in the chair. During the half-hour "gossip" the structural details of belemnites, ammonites, and nautilites were discussed, and illustrated by a series of instructive specimens collected by the members. At the formal meeting, Mr. W. GRAY, M.R.I.A., submitted his report as delegate to the Dover meeting of the British Association, reported on the steps originated by the Field Club for inviting the British Association to revisit Belfast, and the favourable reception given to the deputation from Belfast by the general committee of the Association, indicating that the Association would probably come to Belfast in 1902.

The Rev. M. FAHY delivered a lecture on "Antiquarian and Natural History Notes of the Parish of Duneane and Barony of Toome." The parish and church of Duneane, or Dunaen (the fort of the two birds), are of very ancient date, extending back to the sixth century, or earlier. Mr. Fahy, having fully described the topography and folklore of the parish, described the crannoges, souterrains, forts, holy wells, and other forms of antiquarian remains. Mr. Fahy spoke of the botany and natural history of the locality, naming the characteristic plants, birds, and fishes. From an economical point of view the Pollan, Salmon, and Eel are the most important fish captured at Toome. Of Eels as many as 67,200 have been taken in a night, and yet there is very much still to learn about the life history of the Pollan, Salmon, and Eel.

At the conclusion a discussion took place, and some new members were elected, and the meeting terminated.

APRIL 18.—ANNUAL MEETING.—Francis J. BIGGER, M.R.I.A., in the chair. Mr. William Gray (Hon. Secretary) read the report of the Committee, which stated that there were now 322 members on the Society's list, and that the practical interest taken in the work of the Club was fairly maintained. The following field meetings were held during the year:—Armagh, May 20th; Cargan and locality, June 10th; Dundrum, June 24th; Dungiven and Limavady, July 11th, 12th, and 13th; Toome, August 12th; Ballynahinch, September 2nd. All the excursions were well attended. A list was read of the papers brought forward at the winter meetings, of which reports have appeared in these pages.

The report of the botanical section was satisfactory, their methods of operation affording exceptional opportunities for becoming acquainted with the flora of the North, under the presidency and guidance of the Rev. C. H. Waddell, whose devotion to the interests of the Club the Committee gratefully acknowledged. The Cyperaceæ was the branch mainly studied.

Of the prizes offered by the Club, Miss S. Blackwood secured one for a collection of Liassic fossils, including twenty-five species from the Lias of Islandmagee. Mr. Joseph Malcomson also received a prize for a collection of Irish plants, consisting of 284 species, well-selected examples, and beautifully mounted. The reports and statement of accounts were passed. The election of officers was proceeded with. Mr. F. J. Bigger, M.R.I.A., was elected President, and Mr. W. H. Phillips was elected as Vice-President. Mr. Phillips was also re-elected Treasurer, and Mr. William Gray, M.R.I.A., and W. D. Donnan, M.D. Hon. Secretaries, with the following members of Committee:—George Donaldson, W. J. Fennell, M.R.I.A.I.; J. St. J. Phillips, A.R.I.B.A.; John Hamilton, Alexander Milligan, H. L. Orr, S. A. Stewart, F.B.S.E.; John Vinycomb, M.R.I.A.; Robert Welch, and Joseph Wright, F.G.S. With reference to the coming year's work, it was suggested that a committee be appointed to investigate the fauna of Lough Neagh, and, in anticipation of the visit of the British Association, that a revised edition of the Club's guide should be prepared.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL 10.—The last business meeting of the winter session was held, Mr. GREENWOOD PIM, President, in the chair. The minutes of the previous meeting were read and signed. The Rev. W. ELLISON read a paper on "A New Use for an Astronomical Telescope," which will appear *in extenso* in a succeeding number of the *Irish Naturalist*. The President, Mr. Palmer, and Dr. Alcock spoke on the paper. Dr. Alcock (Hon. Sec.) read several "Natural History Notes" for Mr. J. G. ROBERTSON, who, through illness, was unable to be present at the meeting. One of Mr. Robertson's notes on the occurrence of the Kingfisher at Ranelagh will be found on page 159 of this number. The other notes dealt with the growth of the old Acacia trees in the Sandford district, as testifying to the age of the settlement of the neighbourhood. One tree growing in the garden connected with the rectory of Sandford

is probably the oldest and largest specimen of the species to be found in Ireland, being about sixty feet high. It originally possessed five great limbs springing from a trunk, which contrary to the usual habit of growth of the *Acacia* is only about three feet high. This tree has lost two of its great limbs; one of them measured in section 21 inches by 16 inches; the three remaining limbs appear to be equal to this size. The circumference of the trunk at a foot above the ground is about thirteen feet. The great limbs are bare of branches until they reach a height of thirty feet or so. But what is most remarkable in connexion with this tree, is, that a common Holly about ten feet high, with a stem of two inches in diameter and branches thin, greatest spread about six feet, foliage of a fine healthy growth, is growing upon it. In the concave surface of the top of the trunk, encircled as it is by the limbs, in course of time a deposit of decayed vegetable matter, added to by dust and soot during a long series of years, formed a sufficient bed for the vegetation and support for a time of a holly-berry dropped by some passing bird. But how has a Holly-bush, resting on such shallow soil, withstood the drought of many seasons? No doubt its roots made their way into the trunk, and have now worked through it into the ground.

The Rev. W. Ellison, Messrs. Pethybridge and Smyth were duly elected members, and Mrs. Ellison and Mr. G. W. Nicholson nominated as candidates for election at the next meeting.

MAY 12.—The first excursion of the summer season took place. A party of thirty left Amiens-street by the 1.50 p.m. train for Malahide. The Rev. W. Ellison acted as conductor. The members walked along the Portmarnock road in the direction of the strand, until the fossiliferous limestone rocks were reached. Here Dr. Foord demonstrated to the party the presence of many forms of fossils (brachiopods, trilobites, crinoids, &c.), and collectors secured some interesting specimens. After a most enjoyable afternoon the party proceeded back to the Malahide Hotel, where tea was provided at 5 o'clock.

CORK NATURALISTS' FIELD CLUB.

MAY 5.—The first excursion of the season was made to Waterfall and Ballincollig. The party explored the glen, and bog between the two places, with the following results:—*Ranunculus hederaceus* was very abundant, and *Chrysosplenium oppositifolium* was in some places a veritable covering for large pieces of rock. The fertile stems of the *Equisetum arvense* were very much in evidence. Two thick clumps of *Saxifraga tridactylites* were found on an old wall. Many of the hedges were composed almost entirely of *Vaccinium myrtillus*. A great scarcity of mosses was noticed in this district.

NOTES

BOTANY.

***Cladium jamaicense* and *Carex riparia* in Co. Down.**

A winter's day, ten years ago, I spent in going over the then partially constructed line from Downpatrick to Killough, by invitation of my friend, Leonard Bell, C.E., Resident Engineer. At the point where the foundations of the bridge over the Killough-road were pegged out, the leaves of a large sedge were noticed, which I could not identify at the time; and driving back to Downpatrick in the twilight, another unfamiliar cyperaceous plant was seen forming a dense grove in the centre of a marsh by the roadside, three miles from Killough. When cycling last Easter I revisited these spots. The plant at the former place I now recognized as *Carex riparia*, and I observed it growing abundantly in ditches by the railway around Killough distant signal. The second plant was also duly refound, and turns out to be *Cladium jamaicense*. Both of these species are to be reckoned among the rare plants of Co. Down. *Cladium* had not been seen in the county for a century till Mr. Stewart and I rediscovered its only station near Castlewellan, and I subsequently found it near Strangford (*J.N.* vi., 219). *C. riparia* had four previous records:—Gillhall (Corry); Lough Neagh, 1838 (Hyndman); near Belfast, 1806 [extinct]; and Lough Neagh, 1810 [close to Hyndman's Station], Templeton.

R. LLOYD PRAEGER.

Dublin.

ZOOLOGY.

CRUSTACEA.

***Trichoniscus vividus* at Cappagh.**

When on a visit to Mr. Ussher's beautiful demesne at Cappagh, Co. Waterford, last summer I met with *Trichoniscus vividus* in large numbers. This rare woodlouse occurred under fallen leaves and sticks close to the shores of an artificial lake. It was first recorded from Portlaw, Co. Waterford, by the late Prof. Kinalian. I subsequently took it at Borris, Co. Carlow (*Irish Nat.* vol. iv., p. 319) so that Cappagh is the third locality in Ireland. It has never been found in Great Britain, and on the Continent it only occurs in the Pyrenees.

R. F. SCHARFF.

Science and Art Museum, Dublin.

INSECTS.

Lepidoptera of Co. Cork.

A valuable list of Lepidoptera, taken for the most part near Timoleague, by Mr. R. J. F. Donovan, appears in the current number of the *Entomologist* (vol. xxxiii., pp. 143-7). The rare noctuid *Laphygma exigua* is added to the Irish list, while *Leucania unipuncta (extranea)* and *Sterrhia sacraria* are recorded from this country for the second time only.

MOLLUSCS.

Irish Land and Freshwater Mollusca.

In the *Journal of Conchology*, vol. ix., 1900 (pp. 299-301), Mr. L. E. Adams in his presidential address to the Conchological Society has some interesting notes on *Limnæa involuta*, *Geomalacus maculosus*, and Irish slugs generally. Commenting on the great variability of Irish slugs, he remarks that the distribution of varietal forms in the British Isles "is exactly what we should expect if we accept the theory of a Lusitanian origin for our slugs which has been so ably set forth by Dr. R. F. Scharff in his *European Fauna*."

BIRDS.

Spring Migrants In Co. Wexford.

It may interest readers of the *Irish Naturalist* to know that on April 19th the Cuckoo came into this neighbourhood. On the 6th April a Golden Oriole came to my lawn, remaining till next day. On May 8th the Orange-tip Butterfly was in full flight.

THOS. B. GIBSON.

Ferns.

A Kingfisher at Ranelagh.

About three months ago, whilst taking a walk in the grounds attached to the residence (Sandford) of Mr. J. Pile, I was surprised at starting a Kingfisher. It appeared to have been looking after some of the small fish which have been put into an artificial pond formed within the last four years. As the Kingfisher is a rare and shy bird, this appears to have been a daring little fellow to come down from a mountain stream in search of food within a few yards of the back of a terrace, which may be said to form a continuation of city streets.

J. G. ROBERTSON,

Dublin.

Hoopoe In Co. Antrim.

A fine male Hoopoe (*Upupa epops*) was shot on April 23rd at Glendun, Co. Antrim, by Sir Samuel Black's gamekeeper. It had probably only just arrived, as its stomach was quite empty. It was in excellent plumage.

ROBERT PATTERSON.

Belfast.

Call of the Spotted Crake.

On the 10th of May, 1900, having been informed by my butler that an unknown bird had been calling for several nights, I followed the sound for about half a mile until we located it in a swampy spot that was impassable. It was then about 10 p.m. The note was incessantly repeated, like "whuit, whuit, whuit," uttered in a loud, clear tone that reached far and wide in the stillness of the night, and was not interrupted by my approaching within thirty or forty yards. Since the 10th inst. it has only been heard once, so that the bird may have passed away; but it should be remembered that the Spotted Crake has bred in Co. Roscommon, where Col. Irwin found the eggs he has presented to the Dublin Museum. As this bird is a summer visitor to England, it should be watched for in swampy places in Ireland now, and as its call-note is so clear and far-reaching there should be no difficulty in recognizing it. The descriptions of this sound given by Mr. Howard Saunders and Mr. Dresser left no doubt on my mind that my conjectures as to what the species was were correct, though I could not see it.

RICHARD J. USSHER.

Cappagh.

Egyptian Goose In Co. Derry.

A very perfect specimen of the Egyptian Goose was recently shot near Toomebridge by a farmer who found it feeding among his own geese. Where it came from is not known. It is now stuffed, and in the possession of Mr. Frank Grant, Toomebridge. It measures 21 inches in length, 18 in height, with a length of leg about 6 inches.

This bird is hardly ever found in these climates except in ornamental waters. Many unusual visitors, such as the Stormy Petrel, have also been found in this neighbourhood, round Lough Beg.

M. FAHY.

Duneane Rectory, Toome.

[No authenticated wild specimen of the Egyptian Goose has occurred in these islands, and there can be little doubt that the bird recorded by Mr. Fahy had escaped from confinement.—EDS.]

Notes on the Influence of Man and Civilisation on certain Birds.

We often read statements in print to the effect that man and his civilisation are frequently driving away birds or other living creatures from their haunts, not because such haunts are thus made unsuitable, but because the too close proximity of man is objectionable. I suspect that such cases are frequently exaggerated, and that, in the case of birds, it is often rather the capture of the adults, the robbing of their nests, and the general destruction of suitable and attractive breeding places, than any indirect influence which is at work. At all events it is pleasant to record instances where birds have become quite accustomed to the inroads of civilisation. While travelling from Dublin to New Ross, through the beautiful country traversed by the Dublin, Wicklow, and Wexford Railway Company's line, I have more than once noticed Wild Ducks sitting quite at their ease on some pool quite close to which the train passed at full speed. Even the wary Heron too has come to regard the works of man with such familiarity, that he sees no need to interrupt his fishing when a train appears. I must confess, however, that I was a little surprised to catch a glimpse of the reddish breast and blue back of (what I had previously regarded as quite a shy bird) a Kingfisher as the train rushed past the dyke by the Slaney over which it sat. We passed within about twenty yards of the bird, but it remained seated, as far as I could see, quite motionless on a branch overhanging the water. The large black and white Kingfisher, *Ceryle rudis* (Linn.), is, apparently, not so sensible. This bird is a common and conspicuous species in lower Egypt, its haunts being the banks of the Nile, and of the numerous canals and dykes which intersect the cultivated country. An interesting thing happened to me in connection with one of these birds on one occasion as I was travelling by rail from Ismailia to Cairo. A dyke ran alongside the line for some distance, and by this, at a place where no intersecting branch met it, sat a Kingfisher. On the approach of the train the bird took flight and attempted to fly away, keeping its course, however, along the dyke. Its speed, however, was not as great as that of the train, which slowly, but surely, overtook it. The chase lasted for some little distance. At length we came right up to the bird, which all the time had not the sense to attempt to escape by leaving the dyke. It was forced to turn and fly back, and I could plainly see its open bill as, utterly fatigued, it gasped for breath and shrieked with terror just as the carriage in which I was passed it. The observation is also, I think, of interest as giving a slight idea of the pace attainable by this bird when on the wing and at its best speed. It evidently cannot fly at a rate of thirty miles an hour, at least for more than a very short distance.

G. E. H. BARRETT-HAMILTON.

Kilmanock, Co. Wexford.

MAMMALS.

Martens In North of Ireland.

A female Marten (*Martes sylvatica*) was trapped at Bryansford, Co. Down, on 15th February, 1899. It was in rather poor condition. But the finest Marten I have yet seen was trapped at Castle Dobbs, near Carrickfergus, Co. Antrim, on 8th July, 1899. It was a male, weighed 4 lbs., and the colour of the fur is almost black. Thompson records Martens from both of the above localities.

ROBERT PATTERSON.

Belfast.

Whiskered Bat In Co. Down.

On July 28th, 1898, I received a Whiskered Bat (*Vespertilio mystacinus*) from Dromore, Co. Down, being the first record for the county. In 1899 another one was obtained by Canon Lett, as mentioned in a paper read by him at a meeting of the Belfast Naturalists' Field Club on 20th March, 1900.

ROBERT PATTERSON.

Belfast.

Hairy-armed Bat In Co. Wexford.

I am pleased to be able to corroborate my friend, Mr. Barrett-Hamilton's belief, that the Hairy-armed Bat occurs in Co. Wexford. Last summer I repeatedly observed it at Ballyhyland, where a group of bats of this species are in the habit of frequenting a certain pasture-field (called the "lower cow-pasture") every evening throughout a great part of the summer. Having become familiar with the aspect of *Vesperugo Leisleri* on the wing in Co. Wicklow—where Dr. Alcock kindly conducted me to some of its favourite haunts—I was able to recognise it here with confidence, though of course I am still desirous of finding its sleeping-place and obtaining a specimen. In previous summers the shrill and frequent cries of this bat had often attracted the attention of myself and others when passing the gate of the lower cow-pasture, showing that the spot has long been a customary haunt; but until 1899 I had no idea from what species the screams proceeded. Cow-pastures seem, both here and in Co. Wicklow, to be favourite resorts of the Hairy-armed Bat, though not visited till somewhat late in the evening.

C. B. MOFFAT,

Ballyhyland, Co. Wexford.



ABNORMAL SHELLS OF *HELIIX NEMORALIS*, FROM BUNDORAN. *nat. size*



EGG-CLUSTER OF THE KERRY SLUG, *GEOMALACUS MACULOSUS*, ALLMAN. $\times 2$.
To face page 163.

ABNORMALITIES IN THE SHELL OF *HELIX* *NEMORALIS*.

BY R. WELCH.

[Read before the Belfast Naturalists' Field Club, December, 1899.]

(PLATE 5.)

OF the comparatively few and much prized specimens of reversed Helices that are to be found in public museums, or in the cabinets of private collectors in the British Islands, probably the majority are of *Helix nemoralis*, and of these the greater number, if localised at all, will be found labelled "Bundoran, South Donegal." Visitors to that well-known health resort find old peasant-women selling, for a few pence, long necklaces made of the dextral forms of either *H. acuta*, *H. cricetorum* or *H. nemoralis*; the last, being more plentiful and more ornamental than the others, is the species generally used. These land-shells are collected on the great sand-dunes that stretch from the cliffs at the Fairy Bridges, Bundoran, almost to Ballyshannon, and along the Erne River to its mouth. So far, the old women only use the empty shells that may be found in thousands in the dune hollows, and the stock there seems sufficient to supply the local demand for long years to come, without touching the living ones.

With these occur a few beautiful scalariform shells (Figs. 12-19) which are doubtless recognised in the collecting, and suitably cared for; the less rare sinistral (Figs. 1-8) and malformed specimens being likely noted and laid aside as the mass of shells are pierced for use.

Although abnormal shells like these are occasionally recorded in the scientific journals from other places, the total finds of reversed and scalariform specimens of this species from the whole Kingdom during this century, are probably far below those found at Bundoran alone in the last twenty years. During this period about 900 of the former have been received by members of the Belfast Naturalists' Field Club, mainly by Messrs. Gray and Swanston, who have passed most of them on to collections in various parts of the United Kingdom, a smaller number having also been obtained by visitors to the district from the old women themselves. For a

number of years past about 60 to 100 per annum seem to have been found, with one or two "spiders" as I have heard the scalariform shells called at Bundoran.

In addition, some rather interesting "repairs" occur (Fig. 8), also specimens having a considerable rough extension to the otherwise complete lip (Figs. 10 and 11), and an occasional reversed form with a tendency to the scalariform shape (Fig. 7). The majority of the latter are however lower in the spire than the common dextral form. Some of the last are very high in the spire, with deep suture, and I have seen ten specimens distinctly scalariform; a few of these are in the Dublin Museum. One or two were fairly fresh young specimens. These are, I take it, merely monstrosities which occur oftener here than elsewhere. Of the reversals, on the contrary, were they a distinct race now extinct rather than mere "sports"? Their numbers seem to favour the former idea, and I have never seen a really fresh specimen, or one with epidermis on. A few show the banding as clearly as fresh shells, but this (as witness the well-known Dog's Bay finds) may be the case even though they have been buried in dunes for ages. They are of fair size, and, on the whole, weigh more, when not sand-eroded, than the typical living specimens.

On one of my visits to Bundoran, while hunting for "shell pockets" I found living on a small area of the dunes a thick heavy form of var. *hyalozonata* (Fig. 9) with the white lip which accompanies that variety. The pale yellow epidermis is very thin and hardly a trace of it remains by the time the shell is completed. This, wherever else I have collected it, has always been a much lighter shell than the type of the locality where it occurred, and this is also the experience of friends who have given special attention to this species; by type of course I mean the ordinary banded and unbanded forms with dark lip. At Bundoran, on the contrary, many of the shells of *hyalozonata*, though smaller than the type there, are thicker and heavier, so much so, that three or four of the heaviest weigh almost as much in proportion to their size as the average heavy sub-fossil specimens from Dog's Bay, Co. Galway. Four specimens weighed respectively 50, 42, 30, and 27 grains, average 37, a high average even when compared with the heaviest typical shells.

These were evidently some of the "oldest inhabitants," as the epidermis was quite gone. Of the fourteen in all collected alive, eight weighed over 20 grains, and the others, younger shells of the first or second year with lip barely completed, 10 grains or over. The only other place where I got this variety over 10 grains in weight was at Islandmagee, Antrim coast; one of three there weighed 15 grains. But my friend, Mr. Edward Collier, of Manchester, obtained one at Folkestone of 17 grains, and another at Ballyvaughan, Co. Clare, of the same weight, with two much lighter ones. Three specimens in his collection from Peel, Isle of Man, weigh under 6 grains each, and four others from various localities average 8 grains.

The typical shells at Bundoran are rather strong and heavy (as will be seen from the weights of others, from coast localities also, that I give for comparison), but though I examined hundreds, I could find none over 34 grains, and only one of that, the average of the four best being 28 grains, of the ten best 25 grains, much under the weights of the variety respectively. The discrepancy is still greater in the following, which were also selected from the heaviest specimens I could get in each case. Of course, though all were alive when collected, the shells were well cleaned and dried before weighing.

WEIGHTS IN GRAINS.

	Grains.
Portrush dunes. (Out of a large number, two weighed 17 each.) Average of nine best,	= 11
Whitepark Bay, Co. Antrim. Average of ten,	= 9½
Portstewart dunes, Co. Derry. (One 17.) Average of 10,	= 10
St. John's Point, Co. Down. (None over 13.) Average of 12,	= 10
Newcastle, Co. Down. (Shells are thin on dunes here, especially at southern end, and the lightest I have collected anywhere.) Average of ten,	= 4

These were the ordinary banded and unbanded forms (mostly *libellula*), and they were all collected at places where there seemed to be an abundant food-supply—the main factor, one might expect, in the formation of a heavy shell. In the case of the Bundoran specimens, on the contrary, all of the heavy

variety were found on a very bare sandy patch in the most exposed part of the dunes close to Finner Strand, where only a few plants grow sparingly among the Bent (*Psamma arenaria*). Here they are very liable to be covered up several inches or even several feet deep by the shifting sands blowing in from the beach with the prevailing wind. Though many of the type are to be found here also, the latter are in greatest abundance in the inland hollows of the dunes near the River Erne, which are well turfed over, with plenty of food-plants.

I could understand the Bundoran shells, as a whole, being heavier than those from inland or north-eastern coast localities, if a moist climate and freedom from severe frost are among the favourable conditions necessary for long life, and consequent possession of a thicker shell. But why the var. *hyalozonata*, usually a much thinner shell, should here become heavier than the typical *Helix nemoralis* I cannot understand, and mention the fact in the hope that it may be of interest to those conchologists who are engaged in working out life-histories of the land mollusca.

It is certain that a moist, mild climate does not always lead to a thick shell, unless other conditions favourable to its formation are also present. It does seem to influence the size as a rule, and on Valencia Island, S.W. Kerry, the mildest corner of the British Islands, this species is large, though thin and light. I judge by a large number which have at different times been collected there by Miss Delap. She states that they do not hibernate in winter, but only retire for short periods in dry or cold weather to the roots of plants. Thirty-five of these large shells weigh on an average only 9.25 grains, the heaviest being only 11 grains, yet they feed practically all the year round, and the food supply is plentiful.

On the Great Isle of Aran, Co. Galway, this species grows to a larger size than elsewhere in Britain; for their size (many 26 by 19 mm., average 25 by 19 mm.) they are not heavy, nine specimens collected by Mr. R. Ll. Praeger, now in the Dublin Museum, averaging only 13 grains. The climate is like Valência, moist and mild, and the molluscs live in the deep crevices of the limestone terraces, where there is good shelter and food is plentiful. These shells prove that an abundance of calcareous matter present does not necessarily

result in a thick shell, even when the other conditions also seem favourable to weight or size, or both combined.

Dr. Scharff kindly calls my attention to the fact that our thickest British shell, *Unio margaritifer*, lives in the mountain streams of granite areas, where the amount of lime present must be very small indeed. But for these, and some similar cases, I would have ventured the opinion held by many others, that thick shells were the result—in part at all events—of a plentiful supply of lime in the animal's food. So far as these heavy Bundoran shells are concerned, Dr. Scharff considers that, possibly by the action of the salt spray, an abnormal or pathological condition of the mantle is produced which may explain the excessive deposition of lime in the shell. The number of specimens found there which have an abnormal continuation to the otherwise complete shell, like Figs. 10 and 11, seem to confirm the correctness of his conclusions.

It would be interesting to know how long this species will live under the specially favourable conditions present in many places on the west coast of Ireland. I have some still alive that were full grown when collected in September, 1898, on the Belfast hills; and the majority of 44 *Helix aspersa* collected in October, 1896, at Whitepark Bay, are now, after more than three years, still alive. Some of these were quite adult and fully a year old, I should say, when collected. They have been well fed each summer, and protected from severe frost in winter.

EXPLANATION OF PLATE 5.

- Figs. 1—8. Sinistral shells.
,, 10 and 11. Specimens with abnormal continuation to the shell.
,, 12—19. Scalariform specimens.
Fig. 8. Repaired and distorted sinistral shell.
,, 9. Heavy, thick specimen, var. *hyalozonta* (50 grains).

Belfast.

THE EGGS OF THE KERRY SLUG,
GEOMALACUS MACULOSUS, ALLMAN.
BY THOMAS ROGERS.

(PLATE 5.)

THOUGH many naturalists have gone hunting for the Spotted Slug in its native haunts, very few seem to have seen its eggs : indeed, I know of only one published reference to them—that quoted by Dr. Scharff in his “Slugs of Ireland,”¹ on the authority of Simroth, who states that Signor de Silva e Castro had seen the eggs in Portugal, and that they were quite transparent. In view of this, perhaps, the following observations on egg clusters obtained many years ago by myself, and some lately by Mr. R. Welch, may be of interest.

In August, 1875, I received a *Geomalacus* from Kerry, and placed it in a glass jar along with a little carrot, cabbage leaves, and lettuce, which were renewed from time to time, occasionally washing out the jar with clean water. The *Geomalacus* seemed to keep in good condition and bright-looking. In the August of the year following I found that it had deposited eleven eggs of an oval form, about three-sixteenths of an inch long, which appeared to me very large for the size of the slug. The eggs were almost transparent, or opalescent. A month later, when cleaning out the jar, I found that six of the eggs had assumed a dark colour, due to the development of the pigment-cells of the young slugs ; and soon afterwards I found that one of the young slugs had been hatched out, and began to creep about the body of the parent. The two remaining eggs had become quite dull, with no apparent vitality in them, and in one I observed a small worm-like entozoon working round the inside of the inner wall of the egg. Another egg-case had collapsed from some cause. All the young that were hatched out were kept during the following winter, except that now and then one or two were missing.

On the 30th of May, 1877, the jar was examined, and I found that all the young slugs, except one, had disappeared ; this one I placed in a separate jar, but it ultimately died. I came to the conclusion that the young slugs had been eaten by their parent. From the young slug that had been separated from the mother slug I took out the internal shell.

¹ *Transactions of the Royal Dublin Society*, 1891, p. 553.

On the 29th July following I noticed that the *Geomalacus* had deposited fourteen more eggs, which were slightly adhering to each other by mucus. These were removed into another jar, and kept separate from the parent slug. On 20th August eight more eggs were deposited, and placed in a separate jar, as I was anxious to raise a few adults. The eggs which were laid at the end of July were examined on October 12th, and I found that seven slugs were then grown to about half to three-quarters of an inch long; one egg had collapsed; what became of the others I cannot tell.

The eggs deposited on August 20th had not been hatched when I looked at them on October 12th, but by the end of the month they were all hatched, except one, which appeared to be dead. These young slugs increased in size until the beginning of February, 1878 (having been fed with carrot); two of them were then found dead, and very much attenuated. The odontophores of these were found to have the same characters as those of adults.

Of the slugs hatched from the eggs deposited at the end of July previously, I found one dead on the 20th of February, 1878. Thinking that they died for want of animal food, I cut an earthworm in three pieces, and placed it in the jar with four or five *Zonites nitidulus*. On clearing out the jar on March 17th, 1878, I found that the young slugs had begun to diminish in size and number, only two moderately healthy ones remaining, and another much reduced in size, with its head eaten off and the internal shell exposed; of the others I could not find a trace. The earthworm had not been eaten, the head and tail divisions of the worm were still alive, but the centre part was dead. I also found that one of the *Zonites* had a hole through its shell, and the latter was empty. On the 17th March I examined the jar in which were placed the first batch of eggs which I had separated from the parent, and found all the young slugs dead, except two. The discovery of four internal shells of the others leads me to put down their disappearance to cannibalism.

On July 19th, 1878, the parent slug was found dead, but from what cause I could not determine. It might have been through old age, want of proper food, or excessive heat of the month (the latter most probably). The young slugs seemed

to die when they attained the length of about half or three-quarters of an inch. I did not know their proper food, and perhaps I ought to have attended oftener to the cleaning out of the jars with fresh water.

Mr. R. Welch informs me that, while in the Kenmare district in May, 1898, assisting in the arrangements for the Field Club Union Conference held there two months later, he collected a large number of *Geomalacus*, some of which he fed well on lichens and lettuce, to show at the winter meetings in Belfast and Dublin. On July 22nd one of the slugs laid eighteen eggs in a cluster, partly eating three before he had time to remove them, and on the 25th three more were laid. These were loose, not attached. About a week later the eggs had turned quite brown, and had shrivelled up to half their size, so he placed them in weak alcohol for preservation.

During an Easter visit to the same district last year, Mr. Arthur W. Stelfox kindly collected for him some more specimens near the tunnel on the Glengarriff road. These were larger and much darker in colour than those previously obtained in more sheltered positions at about 900 feet less altitude. On July 20th the largest specimen (40 mm. long when at rest, 17 mm. wide, 15 mm. high) laid twenty-seven eggs, twenty-four in a cluster and three free; the cluster measured 31 by 16 by 14 mm.; the eggs were fairly uniform in size, the largest $8\frac{1}{2}$ by $4\frac{1}{4}$ mm., the smallest 6 by 4 mm. They varied slightly also in shape, some being almost ovoid, but the majority distinctly tapered at one end, not unlike the shape of a Guillemot's egg. No attempt was made to hatch these; they were promptly distributed to friends who had never seen them. These *Geomalacus* egg-clusters are very beautiful objects, as the photograph (Plate 5) of the last lot Mr. Welch obtained will partly show. They are translucent, with a pearly opalescence which it is impossible to render properly in monochrome, if, indeed, at all.

The Irish specimens are certainly not transparent like those reported from Portugal by Simroth (*loc. cit.*); translucent, with a small transparent area at the narrower end in some cases, would better describe them.

Manchester.

SOME MOSSES FROM NORTH-EAST IRELAND.

BY J. H. DAVIES.

IN the case of muscological botany it seems unsafe to say of any large district that it has been so thoroughly explored that nothing remains to reward the patient investigator. Many of the mosses are so minute, and their distinguishing marks such that they cannot well be recognized without microscopical examination, they are liable to be overlooked or mistaken. Even in areas that have been best searched by the keenest-eyed and most experienced observers one need not despair of meeting with something which has been previously unnoticed. From time to time in the course of the last few months, as my scant opportunities permitted, I have found pleasure in renewing and extending an old acquaintance with these attractive plants, and have met with several species of some rarity and with others that I had never before gathered. A few brief extracts from my notes on some of those that have come under observation, chiefly within a radius of about four miles from Lisburn, and a few noticed between Kilroot and Whitehead, on the County Antrim coast of Belfast Lough, may not be unwelcome to those interested in our Irish moss-flora. In addition to some of them being new to the north-eastern district, the short list now supplied includes the names of three species and two varieties which were not before known as Irish plants. These are *Tortula marginata*, *Amblystegium Juratzkanum*, and *A. varium*; the var. *acutifolia* of *Barbula tophacea*, and the var. *subglobosa* of *Weisia viridula*. The latter variety it would seem has not before been noted as British.

It will have been noticed that for several of the more minute *Fissidentes*, which have a wide distribution in Britain, the Irish stations so far recorded are singularly few. In the absence of fructification they are difficult to determine, and even when in fruit may have been passed over without being discriminated from the nearly allied and everywhere common *Fissidens bryoides*. But the bryological productions of many parts of our island have been too much neglected. In Dr. Moore's "Synopsis of the Mosses of Ireland" (1872) only

eighteen counties are mentioned. Irish bryologists are unhappily few in number, and the places of those best known, who in recent years have gone *ad plures*, have not been filled. Such researches as I have been able to make during the past winter (the season in which most of the species of the genus *Fissidens* are in perfection) have been rewarded by the detection in the neighbourhood of Lisburn of three scarce species, *F. exilis*, *F. incurvus* and *F. viridulus*. Specimens of each have been examined by Mr. H. N. Dixon, M.A., F.L.S., for whose kindness therein, and in various other ways I wish here to express my most sincere thanks. *F. pusillus*, a species which Mr. Stewart discovered in Co. Antrim some years ago (and which is not known elsewhere in Ireland), and *F. tamarindifolius*, which I have had in view, have so far eluded me, but these I hope may yet be found.

Polytrichum gracile, Dicks.—Damp peaty places on White Mountain, Co. Antrim. Moore states that it is common in Ireland. It is not found to be so in the North, but, as he says, it may sometimes be passed over as a weak state of *P. commune*, to which it has a general resemblance.

Dicranella crispa, Schp.—With *Polytrichum nanum* var. *longisetum*, on a sandy bank by the Ravarnette river, near Lisburn, Co. Down, where it was abundant and in good fruit in November. It is one of the rare species, first recognized as Irish near Belfast by Templeton in the beginning of the present century.

Dicranella squarrosa, Schp.—In wet places on White Mountain, Co. Antrim.

Dicranoweisia cirrata, Lindb.—On Hornbeam and other trees in several places about Lisburn, Co. Antrim. Seems to be rare in Ireland (though frequent in England), and cannot now be found in Templeton's original locality, which was the only other station for this moss in Co. Antrim.

Fissidens exilis, Hedw.—On a clay bank, by the roadside, near the quarry, at the foot of White Mountain, Co. Antrim. One of our rarest Irish mosses, hitherto known only in two places, both near Belfast, the last notice of it being by Mr. Stewart (1880). A very minute and beautiful species, which might be overlooked for a small form of *F. bryoides*, but, even without close examination, the short bright red seta and large acutely-conical lid, which is about as long as the capsule, will be found to be good distinguishing characters.¹

¹ Since writing this I am informed that *F. exilis* has recently been met with by Mr. S. A. Moore, also in Co. Antrim.

Fissidens viridulus, Wahl.—On moist sandy banks, by the side of the road over Tullyard, and at Lisnatrunk, Co. Down, also in similar situations at Ballymacash and Derriaghy, Co. Antrim, and in other places near Lisburn. Dr. Moore knew of only one Irish locality (Howth), and it cannot be found that there is any later record. From the frequency of its occurrence about Lisburn it may be assumed that it will be met with elsewhere. A smaller plant, with a shorter fruit stalk than *F. bryoides*. As Mr. Dixon points out to me, the male inflorescence is very small at the base of the stem, whereas in *F. bryoides* it is pretty conspicuous in the axils of the upper leaves.

Fissidens incurvus, Starke.—Clay banks by the wayside at the southern slope of White mountain, and in a like situation by the sea-side at Kilroot, Co. Antrim. There is no mention of this in the "Synopsis," and it was unknown to Mr. Stewart when making his catalogue of mosses for "Flora of the North-east of Ireland." The moss, I make out, was first recognized in Ireland by Canon Lett, who has sent me specimens which he gathered at Derryadd, Co. Armagh, in 1885. Mention of his discovery, he informs me, was made in a paper soon afterwards read by him before the Belfast Naturalists' Field Club, but not published in their *Proceedings*. The same bryologist also met with it later in Co. Louth (*Proc. R.I.A.*, 1890). We have thus four Irish stations for the moss, two of which are in the North-east. In its typical fruiting state it is easily separated from the allied species. The seta is longer than in the preceding plant, and the capsule cernuous, not erect as in that. In his most serviceable "Handbook," Mr. Dixon says: "When in fruit, and closely tufted, the plant bears a superficial resemblance to *Dicranella varia*," a remark which, if taken as having reference mainly to the fruit, is very good. The plant occurring at Kilroot is a very small and most interesting form, one which Mr. Dixon, to whom I sent specimens, says he had not before seen, but both leaves and fruit having all the characters of *F. incurvus*, it must, he states, be referred to that species.

Pottia Helmii, Fühnr.—Abundant along the sea-coast from Kilroot to Whitehead, Co. Antrim. A maritime species, which Moore gives as rare in the North. I suspect it is not uncommon. It would seem that he missed seeing it in Co. Derry, but Mr. Lett has collected it at Portstewart in that county, and Mr. Dixon records it from the Giant's Causeway.¹

Tortula marginata, Spr.—On the face of red sandstone rocks near Derriaghy—Milltown, on the left-hand side of the road from Lisburn to that village, May, 1900. An addition to the Irish moss-flora. In the locality named it occurs in profusion, growing not in tufts or cushions, but in wide-spreading patches. The thickened leaf-margin is best seen under the microscope, but the form of leaf with nerve excurrent in a greenish mucro is distinctive, and by the delicately

¹ *Journ. Bot.* xxix., p. 362.

slender seta of pale amber colour tinged with red it may readily be separated from other species of the section to which it belongs. Derriaghy was one of Templeton's favourite localities, and the exposed sandstone by the wayside there has been often searched both by Mr. Stewart and myself. It seems singular, therefore, that the plant was not previously recognised. The stem is very short, and in the absence of fruit the plant would be almost certain to escape notice.

Barbula tophacea, Mitt., var. **acutifolia**, Schp.—With *Webera carnea* on a steep clay bank by the Lagan canal at the first locks above Lisburn, Co. Antrim. The type is rather common, but the variety, I think, has not before been noticed in Ireland.

Welsia microstoma, C.M.—In old gravel-pits about Lisburn, both in Down and Antrim, where it is usually associated with *Phascum subulatum*. Liable to be mistaken for *Weisia viridula*, which it nearly resembles, and is likely not uncommon.

Welsia viridula, Hedw., var. **subglobosa**, Schp.—Bank by the Lagan, about a quarter of a mile below Lisburn, Co. Down. In fruit, May, 1900. The form of fructification differs widely from that of normal *W. viridula*, the capsule (on a shorter seta) being sub-globose with a much shorter lid. "Your *Weisia* seems to agree very well with the var. *subglobosa*, Schp. as described by Limpricht. The peristome teeth are red instead of pale, but I do not think this would stand in the way of the identification. It is curious that the spores seem larger in some of the varieties than in the type. This is the case with the above variety (in which your plant agrees), and with the var. *densifolia*. I do not think it has been recorded in Britain before." Dixon *in lit.*, 23 May, 1900.

Encalypta vulgaris, Hedw.—On limestone by the sea at Whitehead, Co. Antrim. Seems to be rare in Ireland. In the north there are three other stations, in none of which has it recently been seen, so I am informed by Mr. Stewart.

Funaria fascicularis, Schp.—Sandy stubble fields at Blaris, Co. Down. In no place did I notice more than a few stems together. A rare species, which Moore has recorded from only two counties.

Webera annotina, Schwgr.—On crumbling red sandstone in the glen near Derriaghy, Co. Antrim. With immature fruit in June, 1900. Five stations have been placed on record for this plant in Ulster, where it seems to be confined to Down and Antrim, and in two of them (Templeton's) it has not recently been seen. Elsewhere in Ireland it would also appear to be very scarce. The time for fruiting, according to Mr. Dixon, is summer, but it is a dioicous species and very rarely fertile. Early in June the fructification of my plant was still unripe. Templeton states that he obtained it in fruit in March, 1806, and again in April, 1809, which notwithstanding his characteristic care and accuracy, causes some suspicion that a mistake may have been made. Mr. Dixon informs me that most of the alpine plants

distributed as *W. annotina* with fruit seem to be *W. commutata*. I have not seen examples of the plant recorded from the Mourne Mountains by Canon Lett. It might be well to re-examine the specimens gathered on Slieve Donard, on the chance of their proving to belong to *W. commutata*, a rare moss not known to occur in Ireland.

Bryum murale, Wils.—Wall at "The Plantation," Lisburn, Co. Down, and bridge over Lagan at Lambeg, Co. Antrim. Apparently rare with us, but more likely that sufficient care may not have been used to separate it from nearly related species.

Brachythecium salebrosum, B. and S.—Boggy ground in a field on the left hand side of road from Lambeg village to Derriaghy, Co. Antrim. An addition to the North-eastern list. In his "Synopsis," under *B. Mildeanum*, of which *Hypnum salebrosum* is cited as a synonym, Moore gives only three stations for the species, and notes it as "very rare in Ireland."

Eurhynchium prælongum, B. and S., var. **Stokesii**, Brid.—Foot of Beech trees in the wood at Ballymacash, Co. Antrim. Not before recorded for the North, and appears to be uncommon in other parts of Ireland. Interesting as having been first described and figured as a separate species by Dawson Turner in "Muscologie Hibernicæ" (1804) from specimens gathered by Dr. Stokes at Lough Bray. Turner, however, expressed a doubt of its being entitled to specific rank, and it seems right that it should have been reduced to the position of a variety.

Eurhynchium pumilum, Schp.—Sandy banks in the wood by the roadside at Ballymacash, Co. Antrim. From the scanty records we have for this plant it seems to be rare in Ireland, but it is more likely, I think, that it has been overlooked. It is usually barren, and, in the absence of fruit, not easily distinguished in the field. In the locality now given it is very abundant, covering a high sandy bank for a distance of many yards. I was successful in finding several tufts with perfect fruit in April. The fruit-stalk being very short, the capsules are only slightly exserted above the dense cushiony ramifications, and not readily detected.

Eurhynchium murale, Milde.—Damp walls about Lisburn in both Down and Antrim. It seems a mistake to suppose this species has any special preference for calcareous districts. Common in England. I suspect, from what I have seen of it here, it will be found less rare in Ireland than the few stations recorded have led one to suppose.

Amblystegium Juratzkanum, Schp.—Stony and peaty ground by the sea, about half a mile east of Kilroot, Co. Antrim, April, 1900. New to the Irish flora. Amongst some tufts of a *Bryum* of doubtful species collected at Kilroot that I had sent to Mr. Dixon, he informed me that he had met with a few short stems which he considered might safely be referred to this species. They agreed well with specimens of Juratzka's own gathering of the plant. A fragment

about half an inch long he obligingly returned to me, and pointed out characters by which the species might be known. So much interest was aroused by his kind information that I revisited the locality, when I had the satisfaction of finding it with fruit. It is more robust than *A. serpens*, with broader leaves, more distant and subsquarrose, and spreading when dry. A plant of continental distribution, it was first described as British in a recently published part of Dr. Braithwaite's "British Moss-Flora." At that time it was known only in one locality in Sussex (Mitten, 1893), but has since been met with in other English counties.

Amblystegium varium, Lindb.—Stony and peaty ground, close by the sea, about half a mile east of Kilroot, Co. Antrim, April, 1900. In my quest for the preceding species another *Amblystegium* was noticed differing alike in habit of growth and general aspect both from *A. serpens* and *A. Juratzkanum*. On subsequent examination this proved to be the present species, *A. varium*, and is also an addition to the Irish moss-flora.

Amblystegium irriguum, B. and S.—On decayed wood in the overflow stream from the reservoir, Magheraleane, Lisburn, Co. Antrim. There seem to be only two other Irish stations known for this plant. Mr. Stewart informs me that he has "found it only in Drumbo Glen, Co. Down, where it was fruiting in summer of 1887, but it was omitted from 'Flora N.E.I.' through an oversight." Moore knew of it only in Roscommon. Perhaps not so rare as appears, since it might be overlooked when not in fruit.

Hypnum revolvens, Sw.—Boggy places on White Mountain, Co. Antrim. Though noting this plant for only three counties Moore was probably correct in writing "not rare in Ireland." In North-east, we have no mention of it for Derry, but it is frequent amongst the Mourne Mountains, and has also been found near Carrickfergus.

Lisburn.

SECONDARY SEXUAL CHARACTERS.

Sexual Dimorphism In the Animal Kingdom, a Theory of the Evolution of Secondary and Sexual Characters. By

J. T. CUNNINGHAM, M.A. London: A. and C. Black, 1900: 8vo, pp. xi. & 310. Price, 12s. 6d.

To criticise is one thing, to construct another. In this book, Mr. Cunningham, whose criticisms of the Wallacian denial of the inheritance of acquired characters have been so efficacious in repelling a lodgment by the followers of Weismann on debateable ground, has himself attempted to occupy it and to build thereon a theory of the application of the transmission of acquired characters to the secondary sexual characters of animals. To do this he has given us a very interesting, if not quite exhaustive account of these characters with many new facts, and this part of his book will, I think, give it a permanent value. But I feel sure that for those of us who are in the same camp as Mr. Cunningham, the better part for the present is to aim at keeping the ground clear, rather than to put up works and push forward weak forces which will but give fresh occasion for the advances of our leading opponents; while their inevitable destruction will strengthen the idea prevailing among the enlightened laity, like Mr. Balfour and Mr. Kidd, that the views held by Charles Darwin are now exploded.

As follows from what we have just said, the author seeks to demonstrate that secondary sexual characters are the results of the response of the organism to stimulation, either from within or without. Thus, the growth of the beard in Primates is "due to the stimulation of the growth of the hair by teeth or nails in the combats of mature males;" but on the next page we find: "What is wanted is evidence concerning the influence of mechanical irritation of the hair follicles on the growth of the hair." The probable cause of the loss of the body hair is traced to the wearing of clothes. "In all communities the women pay more attention to the wearing of clothes than men, and this agrees with the fact that women, as a rule, have less hair." In illustration he cites the fact that young animals, like mice and rabbits, born into close warm nests, are naked, and suggests that the carrying of the children on the mother's back, in a fold of some garment, in primitive times, was the cause of the denudation of the infant. On the contrary, the Mandrill is supposed to have acquired the bare grooved patches of its face, by the males scoring one another in their fights for the rarer females, while their coloration elsewhere is explained by the attentions of their mates. Again, the mane of the male Baboons and of the Lion, like the plumes of cock birds, are supposed to have been gained by the habit of these animals of raising them when excited.

The development of vocal sacs in the males of mammals, birds, and frogs is more obviously traced to the yielding of the walls of the cavities

under the stress of sexual excitement. Horns are derived from the use of the head in butting. In the very interesting discussion of the various kinds of horn no mention is made of the use of the horns in the reindeer for shovelling away snow, as an explanation of their presence in the female. We miss in all this section any attempt to bring these secondary sexual characters into correlation with "recognition marks," so obvious in the deer and antelopes, with their combination of white "sunflower" patches of erectile hair with scent glands, so as to make a double appeal to their fellows. This seems the more remarkable, as it is an obvious suggestion that sexual ornamentation is derived from recognition marks by intensification.

The chapters on insects and crustaceans are very interesting, the former dealing, to some extent, with the question of protective mimicry.

The book is admirably got up, well written, well illustrated.

MARCUS HARTOG.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include an African Wild Ass from Mr. W. H. Goodwin, three black-headed Gulls from Mr. F. H. Greene, a pair of Crowned Pigeons from Mr. J. N. Lentaigue, a Parrakeet from Mrs. Blair White, a Kestrel from Mr. W. W. Despard, and a Long-eared Owl from Mr. R. Warren. Five Wolf-cubs have been born in the Gardens.

13,320 persons visited the Gardens during May.

DUBLIN NATURALISTS' FIELD CLUB.

JUNE 9.—The second excursion of the season—to Lambay Island—took place under the direction of Dr. C. J. Patten, Hon. Sec. The attendance numbered twenty-eight members and visitors. The party left Amiens-street by the 10.30 a.m. train for Rush station, where cars awaited to convey them to Rush Harbour. Here they embarked on a lugger for Lambay Island. Unfortunately the weather became so inclement that it was quite futile to attempt landing on the island. It was thus decided to return to Skerries, where the party disembarked at about 5.30 o'clock.

Dinner was served at 6 o'clock in the Temperance Hotel. The party having nearly two hours at their disposal after dinner, before the arrival of the train, took a walk along the Skerries strand, where a number of natural history objects were examined. The different species of sea-birds seen from the boat were pointed out and enumerated by Dr. Patten.

The party returned to Dublin by the 8.40 train from Skerries.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 9.—The second field meeting of this Club was held in a salt mine near Carrickfergus. A party of fifty reached Kilroot by the 12.30 train, and walked along the shore to examine the raised-beach gravels that occur near the station.

While many members of the party were carefully examining the gravels others were equally busy making additions to their botanical collections. The short time and very limited range of exploration did not promise much, but some of the plants collected are worthy of mention. The Viper's Bugloss was seen growing on waste ground close to the station, and the Pepperwort (*Lepidium Draba*) was found near Eden. The rare moss *Zygodon Stirtoni* was found on the wall of the bridge north of Kilroot. This species is rare in Britain, and seems to be confined in Ireland to the North-east. Many forms of insects were captured and preserved for future identification.

Leaving the shore, the party walked on to see the Garden of Eden, and thence on to the Tennant Salt Mines. Here every suitable arrangement was made for the descent into the mine, and the whole party were lowered to the floor of the mine, some 335 feet from the surface. The ordinary miners' lamps were supplemented with coloured lights, and the grand face of salt 46 feet thick, was very carefully displayed—so clearly indeed that a photograph was taken of the scene.

In 1850 the then Marquis of Downshire, anxious to develop the mineral resources of the county, made trial borings in search of coal near Carrickfergus, and along the slopes between it and Carrickfergus. At Duncrue, to the north-west of the town, rock salt, not coal, was struck at about 600 feet from the surface, and since then the rock salt has been worked with more or less energy, and it is now developed into a very valuable local industry. About ten years ago the Chemical Salt Company opened the mine at Eden. The thickness of the bed of salt rock at Eden is 96 feet. Of this about 50 feet is kept intact to form the roof of the mine, and the lower 46 feet is worked almost in one face of pure salt in a series of great spacious chambers 30 to 40 feet high. Mr. T. A. Walker conducted the party through the workings, and explained that all the rock was shipped to their works in England and Scotland. An interesting discussion took place in the mine as to the nature and origin of the deposit and its relation to all the other geological formations of the County Antrim.

At the formal meeting held in the mine under the chairmanship of the Vice-President, Mr. W. H. Phillips, some new members were elected, and the thanks of the Club passed to Mr. Walker for his attention and courtesy during the day.

After a smart walk back to Carrickfergus the party had the very great advantage of seeing over the Castle, by the kind permission of the military authorities. This excellent example of an Irish castle bristles with historic reminiscences.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JUNE 14.—ANNUAL MEETING.—MR. JOHN BROWN, J.P., President-Elect in the chair.

MR. R. M. YOUNG, Hon. Secretary, read the notice convening the meeting, and afterwards submitted the annual report, which recorded the work of the winter session and enumerated the papers read, adding that the Gilchrist course of lectures had been very successful, and that a moiety of the balance remaining after all expenses were paid had been handed to the Council by the local Committee, with the recommendation that artisans should be admitted to the Museum by ticket on certain days. After referring to the additions to and changes in the Museum collections, the report deplored the loss of the President, the late Mr. Thomas Workman, J.P., who died after a short illness at St. Paul's, Minnesota, on the 11th of May last. He had been for many years an active and valued member of our Society, and of the Council, in which he was a vice-president and librarian. During his two years of office as president he was most zealous for the interests of the Society, and in last September was chosen to issue the city's invitation to the British Association at the Dover meeting. Council, at their annual meeting on the 6th inst., unanimously passed a resolution recording their deep sense of the loss the Society, the scientific public, and the community at large had sustained in his removal, and tendering to his widow and family their deep sympathy with them in their sad and sudden bereavement. The Council also received with much regret the announcement of the deaths of Professor John F. Hodges, M.D., a former President of the Society, and of James Thompson, J.P., one of the oldest and most valued members, whose brother William died when President in 1852. Captain Robert Campbell, the donor of many valuable specimens in the Museum, has also passed away much regretted. The meeting was asked to elect five members of Council, in place of the five who retire by rotation and are eligible for re-election, viz., Professor Fitzgerald, President Hamilton, T. F. Shillington, Sir Otto Jaffe, and R. M. Young.

The Treasurer (MR. W. H. F. PATTERSON) submitted the financial statement, which showed a balance of £80 to the Society's credit, in addition to £400 invested in York-street Company debentures. He added that the subscriptions showed a slight falling off, which had been the case for several years past.

President HAMILTON moved the adoption of the report, which was seconded by MR. R. LL. PATTERSON, and passed.

The retiring members of Council were then re-elected, and the officers for the year elected as under:—President, Mr. John Brown, J.P.; Vice-Presidents, Rev. Dr. Hamilton, Messrs. R. Ll. Patterson, D.L., Robert Young, J.P., and William Swanston; Hon. Secretary, Mr. R. M. Young, J.P.; Hon. Librarian, Mr. J. H. Davies.

The Hon. Secretary reported that Mr. Davies had discovered three species of mosses which were new in Ireland, specimens of which would be placed in the Herbarium.

NOTES.

BOTANY.

Orobanche major fertilised by Wasps.

I do not know whether it has been recorded that wasps are agents in the fertilisation of the Greater Broom-rape (*Orobanche major*, L.). At the beginning of June this year I twice observed a wasp busy gathering honey from that plant, the upper surface of the insect's thorax getting completely dusted over with the whitish pollen. The wasp was *Vespa rufa* in at least one instance, probably in both. Wasps are known to be the principal pollen-carriers of *Scrophularia aquatica* and *S. nodosa*, and, according to Darwin, are the only insects which perform that office for *Epipactis latifolia*. But, on the whole, the wasp-fertilised flowers of this country may be considered a small and select group. As far as I know, they are all dull in colour, in which respect *Orobanche major* is well qualified to join the circle. Have bees, hive or humble, been observed visiting this Broom-rape? I do not remember having seen them at it.

C. B. MOFFAT.

Ballyhyland.

ZOOLOGY.

ANNELIDS.

British Marine Worms.

The second part of Prof. W. C. M'Intosh's great monograph of the British Annelids has recently been issued by the Ray Society. The first part was published in 1873-74, and included the nemertine worms—a group but little known to the ordinary public, although comprising some marine species attaining to a length of several yards. The part now issued included five families of Polychæta, almost all of which are marine worms. They have a conspicuous head and the segmented body is furnished at the sides with bristles.

It may be mentioned that Prof. M'Intosh applies the term *British* (now frequently used for purely English and Scottish species) to species occurring not only in Irish waters, but on the coasts of the Channel Islands. Prof. M'Intosh has had the opportunity of examining the large collection of marine worms in the Dublin Museum, and he acknowledges the assistance received from various Irish naturalists in the way of specimens. Over thirty of the species mentioned in this part of the monograph are Irish, the following being peculiar to the Irish marine area:—*Euphrasyne armadillo*, *Lactmatonice producta* var. *britannica*; *Harmothoe Fraser-Thomsoni*, *Phyllantinoë mollis*, and *Sthenelais Jeffreysii*.

Eusthenelais hibernica, since its discovery off the Irish coast, has also been taken in the Mediterranean, but nowhere as yet in the strictly British marine area.

CRUSTACEA.

British Amphipoda.

In the January, February, and April numbers of the *Ann. Mag. Nat. Hist.* (7th ser., vol. v.), Rev. Canon A. M. Norman commences a revision of the British Amphipoda, including not only Ireland, but (like Prof. M'Intosh) the Channel Islands also in the "British" area. The list is most useful to zoologists, and contains a large number of Irish records.

INSECTS.

Psychodidæ from Co. Donegal.

Two rare species of this obscure family of Diptera—*Pericoma mutua*, Eaton, and *P. trivialis*, Eaton—are recorded from Kilmacrenan, Co. Donegal, by Mr. J. J. F. X. King in the June number of the *Entom. Mo. Mag.* (vol. xxxvi., 1900, p. 135.) The specimens, identified by the Rev. E. A. Eaton, have been kindly given by Mr. King to the Dublin Museum.

Additional Records of Irish Coleoptera.

In continuation of my previous note (ante, p. 131) I have to record the following:—

Haliphus obliquus, F., and *H. confinis*, Steph., Loughgall; *H. flavicollis*, Sturm., Keady; *H. fluvialilis*, Aubé, Toome, and near Belfast; *Noterus clavicornis*, De G., Loughgall and Clonmacate close to Lough Neagh, in drains; *Cœlambus ix.-lineatus*, Steph., Toome, taken by Mr. R. Welch; *Hydroporus tristis*, Payk., Churchill, Co. Armagh; *H. angustatus*, Sturm., Armagh; *H. morio*, Dej., Newtown-Hamilton, Co. Armagh; *H. discretus* Fairm., Coolmore, Co. Donegal; *Ilybius obscurus*, Marsh, Loughgall; *Rhantus bistriatus*, Berg., Ardara; *Gyrinus elongatus*, Aubé, and *G. opacus*, Sahl., Armagh; *Philhydrus nigricans*, Zett., Clonmacate; *Chetarthria seminulum*, Herbst., Derryadd and Maghery on the shores of Lough Neagh; *Hydriena pulchella*, Germ., Armagh; *Sphæridium bipustulatum*, F., Cushendun, Co. Antrim, var. *marginatum*, F., Armagh; *Cercyon obsoletus*, Gyll., Armagh; *Aleochara bipunctata*, Ol., near Belfast, taken by the late R. Templeton; *A. cuniculorum*, Kr., Lowry's Lough, near Armagh; *Aleochara marens*, Gyll., Armagh; *A. grisea*, Kr., and *A. algarum*, Faur., Greenore, on the sea shore; *Oxyhoda nigrina*, Wat., Holywood, in moss; *Ocyusa incrassata*, Kr., Armagh and Holywood, in moss; both the above were recorded by me (*J. Nat.*, I., p. 19), but erroneously the former as *Aleochara morion*, Grav., and the latter as *Homalota agra*, Heer.; *Ocalea latipennis*, Sharp, taken near Newtown-Hamilton, Co. Armagh, in moss in the month of April; *Calodera nigrita*, Mann, Armagh; *Mymedonia collaris*, Payk., in moss from Scotstown, Co. Monaghan; *Homalota insecta*, Thoms., Loughgilly, in moss.

W. F. JOHNSON.

Poyntzpass.

Entomological Notes from Ulster.

Mr. W. H. PATTERSON, of Strandtown, Co. Down, has been kind enough to send me from time to time beetles which he has collected in various parts of Co. Down since the beginning of this year. Among those forwarded the following are worthy of a record :—In Stormount Demesne—*Bembidium Mannerheimi*, Sahl. ; *Hydroporus discretus*, Fairm. ; *Olophrum picum*, Gyll. ; *Cryptophagus affinis*, Sturm. ; *Dorytomus maculatus*, Marsh, by beating willows ; *Hypera polygoni*, L. In a swamp near the Lagan Canal — *Bembidium rufescens*, Guer. ; *Hydroporus vittula*, Er. ; *Laccobius alutaceus*, Thoms. In the vicinity of Holywood—*Pterostichus strenuus*, Panz. ; *Hydroporus discretus*, Fairm. ; *H. nigrita*, Fab. ; and by beating poplars at Knocknagoney, near Holywood, *Halysia xiv.-guttata*, L. ; *Dorytomus tortrix*, L., quite a nice series of this very distinct weevil ; also another *Dorytomus*, which seems most likely to be *tremula*, F., especially as it was, from Mr. Patterson's description, *Populus alba* that they were on. I have not, however, a type of *tremula*, so hesitate to give an absolute record. At Newcastle, Co. Down, Mr. Patterson collected on the sand-hills and golf links, and succeeded in getting some nice insects. His best capture was *Acidota crenata*, F., recorded by Mr. Buckle from Buncrana sand-hills. I have recorded it from Armagh and Ardara, but the determination was incorrect, and referable to *Olophrum picum*, Gyll. In the present case, as I had made a mistake before about this species, I sent the insect to Mr. G. C. Champion, who kindly confirmed my determination. In addition to this beetle Mr. Patterson captured *Amara trivialis*, Gyll. ; *Laccophilus interruptus*, Panz. ; *Hydroporus lituratus*, L. ; *Rhantus exoletus*, Forst. ; *Ocytus morio*, Grav. ; *Egialia arenaria*, F. ; *Geotrupes typhaeus*, L. ♀. On a former occasion Mr. Patterson sent me a male specimen of this Dor-beetle ; *Lochmea caprea*, L., the only other Ulster record seems to be my own from Coolmore ; *Otiorrhynchus muscorum*, Bris. ; *O. rugifrons*, Gyll. ; *Philopodon geminatus*, F. Though a number of these were obtained, and some of considerable size, none of the curious large white form which have occurred in Donegal and Antrim were met with.

Near Strandtown—*Notiophilus palustris*, Duft. ; a very dark form of *Agabus paludosus*, F. ; the var. *marginatum*, F., of *Sphaeridium bipustulatum*, F. ; *Staphylinus pubescens*, De G. ; *S. caesareus*, Ceder.

I have met with a few beetles here that are worth mentioning. Under the bark of a fir log I found a colony, consisting of *Homalium pusillum*, Grav. ; *H. punctipenne*, Thoms. ; and *Rhizophagus depressus*, F. In the bottom of a haystack which I had removed I found great numbers of *Typhaea fumata*, L. ; they were clinging to the sides of stones and mingled with hayseed, to which they have a resemblance, and from which an untrained eye would scarcely distinguish them. A single specimen of *Lochmea crataegi*, Forst., was captured by Mrs. Johnson ; *Pinus fur*, L., and *Neptus crenatus*, F., occurred crawling on walls of outhouses.

Early in May I took two specimens of the Hemipteron, *Acanthosoma haemorrhoidale*, L., on *Cupressus*—they are the green form. I hoped to have met with others, but though I kept a constant watch I was unable to

meet with it again. On May 16 I found *Piezodorus lituratus*, Fab., in great numbers on Furze (*Ulex europæus*), and I saw them for several days afterwards swarming on the flowers. Mr Saunders says ("Hemiptera Heteroptera," p. 31) that it occurs in the autumn, so that either the insect has a different habit here, from what Mr. Saunders observed in England, or else this was an extra brood. I shall watch for it in autumn to see if there is a second brood.

Among the Lepidoptera my most interesting record is from Donegal. In the first week of April I had a letter from my friend, W. A. Hamilton, Esq., J.P., of Coolmore, near Ballyshannon, telling me that a couple of days previously he had seen in an empty house a butterfly, which, from his description, I felt pretty sure was the Peacock Butterfly (*Vanessa io*, L.). This conjecture was happily proved to be correct by my receiving the battered remains of a Peacock Butterfly which Mr. Hamilton had knocked down with his driving whip between Coxtown and Rosstown. This is apparently the first time this butterfly has been met with in Co. Donegal, for Mr. Kane, in his list of Irish Lepidoptera ("Entomologist," xxvi, p. 189), does not mention that county. *Vanessa urtica*, L., was, as usual, the first butterfly to show, but I did not see it till April 15, when it manifested its ecclesiastical tastes by appearing in the church here. In May there were a few moths about, and I got a couple of nice specimens of *Selenia illunaria*, Hb.

In August last Mr. Carpenter wrote to tell me that larvæ of *Smerinthus ocellatus*, L., had appeared in numbers at Crowhill, near Loughgall. I wrote to Mr. Joseph Atkinson, D.L., of Crowhill, to ask him to send me any that he could get. He sent me four, but only two arrived. These duly pupated and have now emerged (June 7th and 9th).

My friend Mr. Hamilton has sent me a nice specimen of *Halias prasinana*, L. ♂ which he caught in his house at Coolmore, Co. Donegal, on June 4th. Mr. Barrett ("British Lepidoptera," II., p. 177) notes that this moth has the power of producing a squeaking sound, which it appears to do when on the wing.

In reference to Mr. Buckle's queries (*ante*, p. 130), I know of several coleopterists who practice sweeping at night, and by this means get many good species. I have practised myself occasionally, but I seldom got anything of interest; but that was probably my fault in not going where the insects were waiting to be caught.

I never met with *Hydroporus Davisii*, Curt., but I have with *H. septentrionalis*, Gyll., and I saw it rise to the surface for air; but it is very probable that, as Mr. Buckle suggests, it does so at long intervals. In connection with this question of water-beetles coming to the surface for air, can anyone enlighten me as to what happens to water-beetles during frost? I have myself seen a *Dytiscus* underneath the ice on which I was skating. I presume there would be a small quantity of air, but during a prolonged frost this would probably become exhausted and thus the supply be cut off. If any of the readers of the *Irish Naturalist* can enlighten me on this matter I shall feel much obliged.

Poyntzpass.

W. F. JOHNSON.

FISHES.**Attempted Introduction of the American Shad Into Irish Waters.**

It was announced in a recent issue of a Dublin daily paper that Mr. Moreton Frewen was about to deposit 100,000 eggs of the American Shad (*Clupea sapidissima*) in the River Shannon. On my applying to this gentleman for further information, he wrote to say that he regretted that the consignment of Shad ova had all perished on their way to Ireland, but that he hoped to make a further trial. As it is probable, therefore, that we shall soon be able to add the American Shad to the list of fishes inhabiting Irish waters, a few remarks about this fish may be of interest to the readers of the *Irish Naturalist*.

In the first place it is perhaps not generally known that we already possess two different kinds of Shad in Ireland. These, like the Salmon, are marine fish which ascend rivers for the purpose of spawning, and in some parts of Ireland (particularly on the Atlantic coast), they seem to be fairly abundant. They are closely allied to the Herring, belonging to the same family (*Clupeidae*). That they are not highly esteemed as food in Ireland is indicated by the term "bony horses" often applied to them. In England they are known as Twait Shad and Allis Shad. In this country the term "bony horses," "bony horsemen," or "rock-herrings" is probably applied indiscriminately to both species.

From a zoological point of view the introduction of foreign species of animals, unless they can be kept within proper bounds, must be looked upon with disfavour, and should be discouraged. In most cases the artificial introduction of species has not proved a blessing, while many introductions have caused enormous financial losses to the countries which they were supposed to benefit. Such introductions frequently produce a disturbing influence upon the native fauna, and great caution should therefore be exercised in adding new members to it.

Moreover, it is almost certain that Irish people would not take very readily to the American Shad, although it is said to be a much finer flavoured fish than our own. I do not know whether Irish rivers contain very much more food than our young Trout and Salmon require. If not, the latter would have to divide their daily rations of small crustacea and insect larvæ with the newcomers, who, at any rate, would never possess the same commercial value as Salmon and Trout.

It might however be argued (as Mr. Frewen has done very ingeniously in the *Nineteenth Century*, vol. 46, 1899, p. 399), that the Shad fry would be invaluable as a food supply for our older river Trout and Salmon smolts, so that the great depredations of the latter fish amongst their own kind would be avoided.

We look forward to Mr. Moreton Frewen's experiments with great interest, and hope that he may be correct in his supposition that the introduction of the American Shad will prove of very great benefit to Irish fisheries.

R. F. SCHARFF.

Science and Art Museum, Dublin,

BIRDS.

Birds' Nests In Strange Places.

I have at present (May 24) two birds' nests in a rather unusual place. A new hay-shed was put up last summer—timber with iron roof; needless to say it is quite empty now. There is a large square tie-beam going across underneath the roof. An American hand-rake was left lying with its head on this beam and the end of the handle resting on the wall plate. On the head of this rake—just on the wooden bows that are used to strengthen the heads of such rakes—a Blackbird has built her nest and is hatching quite contentedly, while only a few yards away a Song-thrush has built hers on the smooth, white surface of the wall plate. The shed is in a very unfrequented place, so that I hope the young songsters may get away safely. Last June I saw a Wild Duck hatching on top of a wall more than 15 feet high on Devenish Island in Lough Erne. Query, how did she expect to get the young ones down?

Corr, Cornafean.

JOHN A. FARIS.

Birds of Ireland and Switzerland.

In the *Zoologist* for May, 1900, Messrs. C. J. Patten and W. J. Williams publish a paper in which they record in comparative form a number of observations on the relative frequency of birds in Ireland and Switzerland.

Curious Note of a Cuckoo.

A Cuckoo has come to this place regularly for the past ten summers (the length of time I have been in the locality), and does not seem to move far from the house. Its voice is the most peculiar I ever heard, being a cross between a stutter and a hiccough, and some seasons it has been very bad, other seasons not quite so bad, but continues the same the whole season through. Can any reader account for this oddity, or say how long a Cuckoo lives?

Killinchy, Co. Down.

J. G. BURTON.

MAMMALS.

Marten in Co. Londonderry.

On June 4th, 1900, a fine male Marten (*Martes sylvatica*) was caught in a rabbit-trap on the river-bank at The Umbra, Benone, near Magilligan, and sent to the Belfast Museum. The fur was almost black. It had been in the neighbourhood for some time, as an underkeeper had seen it twice on the mountain and wondered what it was; it then took up its quarters near the river, as it had worn a regular path to the edge of the water, being probably attracted by the numerous young Waterhens at present there. It was caught at day-break, as its cries were heard at that time.

Belfast.

ROBERT PATTERSON.



MAP SHOWING OCCURRENCES OF THE RUFF
IN IRELAND.

To face p. 187.

THE NATURAL HISTORY OF THE RUFF.

BY CHARLES J. PATTEN, B.A., M.D.

[Read before the Dublin Naturalists' Field Club, February 20, 1900.]

(PLATE 6.)

THERE are certain species of migratory birds included in the Irish fauna which cannot be considered as absolutely rare, still they occur in such limited numbers, and their visits to our country are of such a brief duration, that they are liable to escape the observations of many ornithologists. Of such birds the Ruff—*Machetes pugnax* (Linn.)—is a good example. It probably occurs in Ireland every autumn, but still is by no means plentiful. The late eminent ornithologist, Mr. A. G. More, mentions it as “a rare visitor, chiefly in autumn,”¹ and many other observers agree likewise on this subject.

The question as to whether the particulars of each and every occurrence of the Ruff should be fully recorded or not is an important matter for consideration. There seems to be a difference of opinion on the subject. Some ornithologists seem to think the bird too common. For my own part I think it is well worth while collecting information of as full a nature as possible concerning the occurrence of the Ruff in Ireland. The bird is, to my mind, sufficiently rare for such research.

This is evident when we hear that all the records known of the Ruff as a visitor to our shores when compiled number approximately only about 86.

At first sight these numbers may seem large, but, considering that the records date from the year 1821² up to the present (*i.e.*, a period of nearly 80 years), it is very unlikely that the total number of birds occurring each year could be very large.

Since I last published notes on the occurrence of the Ruff in Dublin Bay (*Irish Naturalist*, vol. viii., p. 225), I have endeavoured to extend my knowledge on the natural history of this bird. I have lately received some valuable information from correspondents and have added new specimens to my collection for the purposes of examination and comparison.

¹ Life and Letters of A. G. More, p. 601.

² To Mr. Ussher I am largely indebted for notes on this part of the subject. I have also consulted Thompson, and Watters' “Birds of Ireland,” the *Proceedings of the Dublin Natural History Society*, &c., &c., from which sources I have obtained much information.

It should be remembered that the Ruff, like many other wading birds, becomes still scarcer on our coast lands as autumn advances, consequently it afforded me no small amount of interest when I obtained an immature specimen on the 11th of October, last year (*i.e.*, 1899), shot by Mr. W. Walker at the North Bull, Dublin Bay, and forwarded to me by Mr. E. Williams. But the late date of occurrence was not the only interesting point about this specimen, for in addition it had *already assumed almost completely its winter plumage*. Immature Ruffs generally leave our coasts while still in autumn garb, hence the increased value of a specimen obtained in winter plumage.

I made a comparison between the plumages of some immature autumn specimens and that of the winter Ruff¹ and found that they differed considerably.

AUTUMN.²

At this time of year the feathers of the forehead and crown are blackish brown, edged with buff. Those of the occiput and nape are nut brown, with faintly marked black centres.

The cheeks, ear coverts, and lore are rufous coloured, and faintly speckled. Under the chin is a white triangular patch. From this a faintly marked white line extends upwards and backwards under the ear coverts. The ante-orbital feathers are light grey. The whole throat (upper and lower regions) and breast are of a rich buff colour. The abdomen and undertail coverts are white. The rectrices are greyish, with black tips and rufous edges. The middle upper tail coverts and lower back feathers are dark brown, with dull rufous edges. The outer upper tail coverts are white. The inter-scapulars, scapulars and tertiaries are black, with rufous edges. The wing coverts greyish brown, edged similarly. The secondaries are dark grey, with white edges, the primaries being dull black or very dark brown. The small leg feathers are dun-coloured, slightly mixed with white. Any slight differences which exist between the plumages of the male and female in autumn are to be found chiefly in the region of the breast and throat. In the female these are often of a richer buff colour, which may extend further backwards towards the abdomen than in the case of the male.

Mr. Williams has kindly allowed me to examine his pair of immature Ruffs shot 28th August, 1897. They are particularly well-marked, and

¹ In autumn and winter the males and females are practically alike in plumage.

² Inasmuch as the feathers are liable to fade after death, even in well-preserved specimens, I have taken notes on the colour of the plumage while the birds were still in the flesh in a fresh condition.

the shading of the feathers is very rich. The owner pointed out to me the following *minor differences* in the plumages of the two sexes. Firstly: the difference in the shade and distribution of the buff-coloured feathers already described. In the female these reach almost as far back as the under tail coverts, hence a considerable amount of the abdominal feathers are buff-coloured. In the male the buff stops short about the middle of the abdomen. Secondly: the rufous edges of the scapulars and inter-scapulars are broader in the female than in the male, and the central portions of these feathers are darker in the former sex. Thirdly: the tertiaries of the female are crossed with bars of black and buff,¹ whereas in the male the same feathers are only edged with these colours.

WINTER.

Feathers of the forehead, crown, nape, and occiput ashy grey in colour, with indistinctly marked darkish centres. The cheeks, ear coverts,² chin, lore, and upper throat are of a dirty white color.³ The lower throat and breast feathers are lightish grey, dappled with faintly marked irregular and broken transverse bars of a darker grey colour. The ante-orbital feathers are dark grey. The abdomen and under tail coverts are white, as in autumn. The rectrices are dappled grey and white. The upper tail coverts and lower back feathers are similar in colour to those of the autumn plumage, except that the rufous edges have nearly disappeared. The inter-scapulars, scapulars and tertiaries are grey, with dirty white-coloured margins. The tertiaries are in addition tipped with black. The secondaries and wing coverts are also grey, the white edges being more distinct.⁴ The primaries resemble those of the autumn plumage. The leg feathers are dappled grey and white.

It is not my intention in this article to enter into a detailed account of the occurrence of *each* Ruff hitherto observed in Ireland. Most of the facts concerning these have been already published. It is more expedient to draw up a table containing many important statistics of the history of the Ruff as a visitor to Ireland. In this way it may be possible to review any changes which may have taken place in the distribution of this bird in time and space.

In the fifth column of the Table, M stands for male, F for female. In the sixth column, A = adult, and I = immature. In the seventh column, N = nuptial plumage, A = autumn plumage, W = winter plumage, S = summer plumage.

¹ I did not find this condition of the autumn plumage in all female Ruffs examined.

² The ear coverts are fairly dappled with grey.

³ In the winter, the white patch under the chin passes continuously into the same colour of the cheeks and lore.

⁴ In autumn the white edge is narrow and less defined.

TABULATED RECORDS OF RUFFS FROM IRELAND SINCE 1821.*

Number.	Year.	Month.	County.	Sex.	Age.	Plumage.
3	1821	May,	Derry, .	M.	A.	N.
2	"	Sept.,	Down, .	?	I.	A.
6	1822	August,	"	?	I.	A.
2	1828	"	Antrim, .	F.+?	I.	A.
1	1833?	?	Dublin, .	?	I.	A.
1	1833	August,	Down, .	M.	I.	A.
1	1835	"	"	F.	A.	A.
1 or 2	"	Sept.,	"	M.+F.+?	A+A+I.	A.
1 or 2	"	"	"	M.+F.+?	A+A+I.	A.
12	1837	?	Donegal, .	?	?	A.
	1838	?	"	?	?	A.
3	"	Sept.,	Down, .	?	?	?
3	"	Nov.,	"	?	?	?
6	"	March,	Kildare, .	M.	A.	W.
1	1840	Sept.,	"	?	?	?
1	1841	"	Down, .	?	?	?
2	1842	"	"	M.	A.	S.
2	1844	"	"	?	?	?
1	1845	October,	"	?	?	?
2	1847	October, and Nov.	Kildare, .	?	?	?
1	1847	?	Dublin, .	?	?	?
1	1848	October,	Down, .	F.	?	?
2	1848	August,	Tipperary, .	M.	A.	S.
4	1848	"	"	?	?	?
1	1849	October,	Waterford, .	F.	?	?
1	1850	Nov.,	Antrim, .	F.	?	?
	or 1851	"	"	F.	?	?
1	1853	?	Wicklow, .	?	?	?

* Excluding those recorded from unknown counties.

Number.	Year	Month.	County.	Sex.	Age.	Plumage.
1	1864	?	Roscommon,	M.	?	?
2	1870	Sept.,	Dublin,	M+F.	I.	A.
2	1880	„	Armagh,	M+F.	I.	A.
1 or 2	1884	?	„	?	?	?
1	„	Sept.,	Sligo	F.	I.	A.
1	1888	?	Kildare,	?	?	?
3	1887	Sept.,	Down,	?	?	?
1	1889	„	Mayo,	?	I.	A.
1	„	August,	Galway,	?	I.	A.
1	„	October,	Cork,	F.	I.	A.
1	1890	„	Waterford,	F.	?	?
1	before 1891	?	Donegal,	M.	A.	N.
1	„	?	„	?	?	?
1	1891	Sept.,	Mayo,	?	?	?
2	1892	„	Donegal,	?	?	?
1	„	October,	„	M.	?	?
2	before 1893	?	Roscommon,	?	?	?
1	1894 or 1895	?	Dublin,	F.	?	?
1	1895	August,	Wicklow,	F.	I	A.
1	1896	Sept.,	Sligo,	M.	I	A.
2	„	„	Mayo,	?	?	?
1	„	„	Wexford,	M.	I.	A.
1	„	February	Cork,	?	I.	W.
1	„	Sept.,	Dublin,	M.	I.	A.
2	1897	August,	„	M+F.	I.	A.
1	1899	Sept.,	„	F.	I.	A.
2	„	October,	„	F+M.	I.	A+W.
1	„	August,	Cork,	?	?	?

From the above table it may be seen that the Ruff has occurred in 18 counties out of the 32, that is in more than half of the total number. It has visited the coastlands of all four provinces (Ulster, Munster, Leinster, Connaught), but has been most frequently seen in Ulster and Leinster—especially the counties of Down and Dublin.

At the time when Thompson wrote it evidently visited the North-eastern coastlands of Ireland more frequently than other districts. Still, I think, had this species been better known by other ornithologists at the time, that more records from the Leinster coast should have been published.

Along the Leinster coast no more suitable locality could be found for the Ruff than the extensive mudslobs and grassy slopes of the North Bull, Dublin Bay, and I have little doubt that if this bird were more eagerly sought for that it would be oftener observed.

The table further shows that the Ruff is more often found in August and September than at any other time of year, also that the vast majority of birds taken were immature¹, in the autumn plumage. As the young birds often go in pairs, the sexes in autumn seem rather evenly divided.

In the spring, according to Thompson's records, it is chiefly males that have been captured, often in batches, up to six in number. This is an interesting fact, as many observers consider that the females on the whole are more numerous than the males. Subsequent to the publication of Thompson's valuable work there have not been many Ruffs noticed in Ireland.

Watters, who wrote much about the same time as Thompson, mentions two specimens obtained on the Bog of Allen in July, 1850.

Few occurrences of the Ruff are recorded in the *Proceedings* of the Dublin Natural History Society between 1849 and 1871. During these years the Ruff² seems to have visited Ireland in smaller numbers than during the earlier parts of the century. It may be suggested that perhaps it was overlooked. This

¹ Unfortunately the sexes and ages of many specimens were not determined.

² Nat. Hist. of Ireland, vol. ii., p. 230 to 232.

can hardly have been the case to any great extent, as many careful and arduous observers were working at ornithology at that period, a period indeed which marks a distinct era in the science in Ireland (*vide Proceedings of the Dublin Natural History Society*).

Although the Ruff may, to a certain extent, be overlooked, it is nevertheless more often observed than many other wading birds of equal scarcity for the following reasons:—Firstly, with respect to the locality which it frequents. It is found not only on the seashore and mudflat, but also inland, on moor and hillside. Hence, it runs the double chance of being shot both by the ordinary sportsman (out perhaps after grouse, &c.), and by the scientific collector. Sportsmen, though often possessing only a very meagre knowledge of ornithology, are, as a rule, keen observers, and so few strange birds pass them unnoticed. Secondly, the Ruff is a good sized bird, and easily seen. Thirdly, it is usually tame, can be approached without difficulty, identified, and easily shot.

In the year 1870 Blake Knox records two Ruffs (a male and a female) from Dublin Bay. They were immature birds shot in September.¹

Nine years afterwards the late Dr. Cox² wrote a most admirable article on the "Birds of the Co. Dublin and Wicklow," and although he was an accurate observer, it is most remarkable that he did not mention the Ruff as occurring in Dublin Bay, and so did not include it in his list. Hence it is likely that the Ruff was scarcer in that locality in the time of Cox than it is now. This is the more confirmed by the fact that for many years past Mr. Williams has been looking out for Ruffs in Dublin Bay, and did not shoot any till 1897. Furthermore, I have recorded several instances of Ruffs from Dublin Bay, all of which have occurred only quite recently. (*Irish Naturalist*, vol. viii.). Mr. Williams, however, informs me that the two Ruffs in the Irish Collection of Birds (Science and Art Museum, Dublin) were shot by the late Dr. Cox on the River Bann in September, 1880. They are an immature male and female.

¹ *Zoologist*, 1870, p. 2410.

² *Zoologist*, 1879.

As in the case of the *Irish Naturalist*, so, too, in the *Zoologist*, few records of the Ruff from Ireland have been published of late years. Briefly, they are as follows:—

¹September 8th, 1884.—One shot by Mr. Little (whilst looking for grouse) on a lone flat moor near Tullylin, Co. Sligo. He presented it to Mr. Warren, who draws attention to the fact it was the *first met with in the western district of Ireland*. (Mr. Ussher informs me that it had occurred in Roscommon in 1864.)

In 1896² there seems to have been a small immigration of Ruffs to the west and south of Ireland. On September 4th Mr. C. Gallagher shot a male on a grouse bog, a few miles from the town of Easky, Co. Sligo. He gave it to Mr. Warren. The bird was solitary and very tame. Mr. Williams received three the same autumn, and Mr. R. J. Ussher had two sent to him from Belmullet, Co. Mayo. (See also Tabulated Records, p. 191.) Mr. R. M. Barrington kindly informs me by letter that he purchased a Ruff in the Cork markets in February, 1896. Mr. Williams preserved it, and tells me that it is a beautiful male in full winter plumage.

It only remains to mention, regarding the occurrence of the Ruff in Ireland, that, assuming that it has not been overlooked to any great extent, it seems to have been most frequent during Thompson's time (having occasionally occurred on its vernal migration), to have subsequently diminished in numbers, and to have, of recent years, been visiting our shores in larger numbers again. As a vernal migrant it has not for many years been noticed.

Possibly its geographical distribution in Ireland is spreading. This still remains to be fully seen. However, in Thompson's time, with the exception of a few records from Kildare, Dublin, Wicklow, Tipperary, Waterford, Clare, (?) and Kerry, (?) the Ruff was confined in its visits to the north-eastern coast, especially Down and Antrim. (See Table, p. 190-1.)

Later, in 1864, it spread to Roscommon, where it has been seen as late as 1893. Lastly, during the past 20 years, it has been observed several times in Armagh, Sligo, Mayo, Wexford, Cork, and once in Galway. (Table.)

¹ R. Warren in *Zoologist*, 1884, p. 429.

² R. Warren in *Zoologist*, 1896, p. 384.

It is to be hoped that this species will extend its range in Ireland, so that it may become better known. It is a bird the habits and structure of which afford a very interesting field of research.

Before concluding this part of the subject I append a table showing how the Ruff has been observed in Ireland during the nineteenth century :—

TABULAR VIEW OF THE EARLIEST AND LATEST RECORDS FROM
EACH IRISH COUNTY.

County.	First Year recorded.	Last Year recorded.
Down,	1821	1887
Derry,	1821	1891
Antrim,	1828	1851
Dublin,	1833	1899
Donegal,	1837	1891
Kildare,	1838	1888
Tipperary,	1848	—
Waterford,	1849	1890
Wicklow,	1853	1895
Roscommon,	1864	1893
Armagh,	1880	1884
Sligo,	1884	1896
Mayo,	1889	1891
Galway,	1889	—
Cork,	1889	1899
Wexford,	1896	—
Clare,	?	?
Kerry,	?	?

Having thus dwelt for some length on the history of the Ruff as a visitor to Ireland, I will now briefly touch upon its general morphological characters.

In no group of birds are the external sexual differences so marked. In the case of most waders the males and females differ but little in size, and still less in their plumage. The Ruff stands out in marked contrast to other waders in this respect.

Before I point out the differences to be noted between the male and female, it should be remembered that in many other respects, both in structure and habits of life, the Ruff resembles such well-known birds as the Redshank, Godwit, Sandpiper, Knot, Sanderling, Dunlin, Snipe, &c., &c. To these it claims close affinities, and is thus included not only in the same large order, *Limicolæ*, but even in the same family of *Scolopacidæ*. The generic name of *Machetes* has only been given to the Ruff by Cuvier¹ on account of its pugnacious habits, with some minor structural differences, and not because it differs to any marked degree from the rest of the family *Scolopacidæ*; indeed, the great systematist, Linnæus, included the Ruff in the genus *Tringa*.² It therefore seems extraordinary how this bird has come to differ so much from other "waders" in special structural characters (mainly sexual) and in habits of life.

Sexual differences in size and colour.—In autumn the immature plumage of the male and female is practically identical. Likewise in winter both sexes are similarly attired.³ Yet the difference in size between the two sexes is so apparent that when they are compared there is no difficulty in determining them. The average-sized male is fully one-third larger than the average-sized female. In spring and early summer the male alters his plumage very much, assuming at that time of year his characteristic "frill," which serves to distinguish him. This is his nuptial plumage, which I will refer to again later

¹ Règne Animal, i., p. 490 (1817).

² *Tringa pugnax*, Linnæus. *Syst. Nat.*, Ed. 12, i., p. 247 (1766).

³ In the "Descent of Man," p. 390, Darwin stated that the sexes differ in winter plumage. If they do the difference is practically imperceptible.

on. At the same time of year the female changes but little from her winter dress (see winter plumage of Ruff, p. 189); she simply becomes more spotted with black, brown, chestnut, and grey. These colours replace many of the more sombre greyish-brown winter feathers of the upper and under parts. I now return to the differences in size between the two sexes. Thanks to the courtesy and kindness of Mr. Williams I have from time to time been able to examine a good number of Ruffs in the flesh. These I have supplemented by an examination of dry skins kindly placed at my disposal by Mr. Carpenter, of the Science and Art Museum. Even in the same sex variation in size is apparent. I found this more so in the females.

In addition to the ordinary measurements given in text books, such as the total length of the bird and the length of the wing, I have added some more, with a view of determining more precisely the external sexual differences.

Out of a large number examined the following are the average measurements at which I have arrived:—

	MALE.	FEMALE.
	Inches.	Inches.
Total length, . . .	$12\frac{1}{4}$	$10\frac{1}{2}$
Length of wing, . . .	$6\frac{1}{4}$	$6\frac{1}{4}$
Expanse of wings, . . .	$23\frac{1}{2}$	$21\frac{1}{2}$
Sternum to cloaca, . . .	$3\frac{1}{2}$	3
Mid-back to breast, . . .	$2\frac{1}{4}$	$1\frac{3}{4}$
Breadth of mid-breast, . . .	$1\frac{5}{8}$	$1\frac{1}{4}$
Legs { Tibio-tarsus, . . .	$2\frac{7}{8}$	$2\frac{3}{8}$
{ Tarso-metatarsus, . . .	$2\frac{1}{4}$	$1\frac{3}{4}$
Length of beak, . . .	$1\frac{1}{2}$	$1\frac{1}{2}$
Nostril,	$\frac{1}{4}$	$\frac{1}{4}$

I wish to call attention to the fact that I measured the wings from the carpal joint to the end of the first flight feather.

It may be seen from the foregoing measurements that in both the male and the female the wing is the same length, viz., $6\frac{1}{4}$ inches. Hence the first flight feathers are the same length in the two sexes ; but the expanse of wings (length from the tip of one extended wing to that of the other) is greater in the male than in the female. This, therefore, must be due to the upper and fore wing being longer in the male. This I found to be true, as the humerus, ulna, and radius of the latter are longer than those of the former.

The body of the female is smaller proportionately than that of the male, but much of the same shape, as shown by the relative measurements. The same remarks apply to the legs. The bill, however, is much the same length in both sexes ; moreover, it is very constant in length, in that respect differing from many waders (Dunlin, Sanderling, Curlew. &c.), in which the length of the bill, even of the same sex, is very variable. It should be noted, however, that the base of the bill of the male Ruff is stouter than that of the female.

The colour of the legs and toes vary, not only according to sex, but also at different seasons of the year, as follows :—

Colour of legs and toes.

¹ Male (immature),	.	.	.	Dark greenish black.
Female, „	.	.	.	Dark brown.
Male (nuptial plumage),	.	.	.	Dull orange.
Female (summer),	.	.	.	Same colour, but a little paler.
Male (adult, winter),	.	.	.	Light brown.
Female, „	.	.	.	„

Difference in weight between the two sexes :—With a variation in size between the two sexes we expect a variation in weight. The average-sized male weighs 6 ounces ; the female 4 ounces. Most writers agree on this point, and judging from the specimens which I weighed myself, I find that I have arrived at a similar result.

Extreme sexual differences in size and weight :—The female Ruff, shot on Balbriggan Strand on 3rd October (*Irish Nat.*, vol. viii., p. 225), was very small, and all measurements were

¹ Mr. Williams pointed out to me the difference in colour between the immature male and female legs on the specimens which he shot on 28th August, 1897. In these pair the colours were well marked.

under those of the average given. It only weighed $2\frac{1}{2}$ ounces. It was in poor condition, being probably somewhat exhausted after its migratory flight.

The female Ruff, shot by Mr. Williams (*Irish Nat.*, vol. viii., p. 225), was exceptionally large and weighed $5\frac{1}{2}$ ounces, being only half an ounce lighter than the male shot the same day. There is an important point to be noticed in connection with this observation. For, as a rule, when a pair of immature Ruffs are shot *early in the season* as these were, and they differ only slightly in size, *it is the male that is smaller than the average, and not the female larger.* This points to the fact that the males grow more slowly than the females, as is the case with many other animals.

Sir R. Payne Gallwey¹ has seen male Ruffs which only weighed 5 ounces, and according to Mr. Yarrell² and Mr. Saunders³ a fattened Ruff will weigh as much as 10 ounces.

Variations in the nuptial plumage of the male:—The assumption of the nuptial “frill” of the male is in itself a most remarkable phenomenon, occurring as it does in a single genus of the large family of *Scolopacidae*. But the variation in this plumage is stranger still, and constitutes a theme, the explanations of which might baffle some of our most brilliant ornithologists. It is a well known fact to ornithologists⁴ that for a short season of the year, during the months of May and June, the neck feathers are greatly changed. They undergo special development, and becoming elongated and much curved they form a “frill” or “ruff” from which the bird receives its name. Now most observers point out that “scarcely any two males have the ‘ruff’ alike;” and whilst laying emphasis on this point they omit to mention that most of the rest of the plumage varies at the same time. In other words, it is not only the neck feathers of one bird which differ from those of another, but also the greater part of the rest of the

¹ “Letters to Young Shooters,” 3rd series, p. 439.

² “British Birds,” 4th Edit., vol. iii., p. 433, 1884.

³ “Manual of British Birds,” p. 600, 1899.

⁴ The Right Hon. Lord Lifford, F.L.S., kept Ruffs in his aviary, and states that by March 15 “they are beginning to resume their shows” (*Zoologist*, 1896, p. 51).

plumage.¹ True it is that some few observers have pointed out that the feathers of the upper parts vary also, and Sir R. Payne Gallwey² mentions that the variation generally corresponds in tint with the bird's "ruff." But when a number of Ruffs in nuptial plumage are examined it will be found, in the majority of cases, that not only do the feathers of the neck and back vary correspondingly in colour, but also those of the top of the head, the breast, and upper part of the abdomen. Now, whilst I freely admit that no bird varies as much in plumage as the Ruff, still I maintain that this variation is restricted to certain definite limits, and so an indefinite number of indiscriminate colours are prevented from appearing. Were this not so it would be well nigh impossible to offer any explanation for the cause of the variety in the nuptial plumage. It is highly important to note that although the shades of the nuptial plumage differ a good deal in intensity, nevertheless the fundamental colours from which these are derived are few in number.

Thus, out of a number of Ruffs examined only three *types* of plumages can be recognized. These, however, are decidedly distinct. They are:—those in which the predominating colour is (1.) Purple-black. (2.) Rich reddish brown. (3.) Yellow, often mixed with white. According to Sir R. Payne Gallwey the reddish brown is the most common, and the yellow and white the rarest.

Some nine years ago, when Ruffs used to be imported as an article of food from the Holland markets to Ireland, Mr. Williams picked out three specimens from a large number on sale in the Dublin markets. These birds were in their nuptial plumage, the "frill" being well developed. They since have come into my possession, and I find that they conform to the three types already mentioned. The following is a brief description of their plumage:—

No. 1. Head and upper part of the "ruff" purplish black, exhibiting metallic sheen or lustre when seen by reflected light. Cheeks and rest of "ruff" transversely barred and splashed with black and white. Breast feathers mostly purplish black, tipped white, some old winter

¹ To be exact it should be borne in mind that the primaries, secondaries, lower abdominal and undertail feathers are practically the same colour in all Ruffs.

² "Letters to Young Shooters," p. 441.

feathers being still present. Abdomen and under tail coverts, dirty white, with a few black spots. Thigh feathers, dark brown and white. Inter-scapulars and scapulars, rich glossy purple black, some feathers being finely edged with light yellowish white. Tertiaries, half barred with black and white, and indistinctly spotted. Lower back and upper central tail coverts, mostly old winter feathers, but some transversely barred like the tertiaries, the bars extending right across the feathers. Outer and upper tail coverts, dirty white. Rectrices, brown; inner ones barred at the extremities like the tertiaries. Wing coverts, principally old winter feathers, the new ones being banded black and white, chiefly at their extremities. Secondaries and primaries, same as in winter.

No. 2. Entire head and neck, including the "ruff," rich reddish brown; many of the feathers, especially of the upper throat and cheeks, tipped with purplish black, and exhibiting a faint metallic sheen on reflected light. Breast, rich brown, dapped with purple black, chiefly at the points of the feathers. Abdomen and under tail coverts, dirty white. Thigh feathers, reddish brown. Inter-scapulars and scapulars, richly variegated with reddish brown and glossy purple black. Some feathers thinly edged with buff. Tertiaries, barred regularly and transversely with bands of black and chestnut, the edges of the feathers being tipped with buff. Lower back and upper tail coverts, dapped brown and black and cross barred. The outer upper tail coverts contain much white. Rectrices:—outer, brown; central barred with chestnut and black and tipped with buff. Wing coverts, mostly winter feathers, but some new variegated ones resembling the tertiaries. Secondaries and primaries, same as in winter.

No. 3. Throat, head, upper, and back part of "ruff" pale "Naples" yellow, delicately streaked on the top of head and cheeks with black. Remainder of "ruff," white, with a few glossy black feathers interspersed. Breast, (a) many dirty greyish white feathers—old winter plumage. (b) A few new black feathers tipped with yellow. Abdomen and under tail coverts, dirty white; a few tipped with black. Thigh feathers, light brown and white. Inter-scapulars and scapulars, variegated yellow and black, being beautifully peppered with fine black dots. Tertiaries transversely barred with yellow and black, spots of black being interspersed amongst most of the yellow bars. Lower back and inner upper tail coverts principally old winter feathers, the new ones resembling the tertiaries. Outer upper tail coverts, white. Outer rectrices brown, inner barred at the end like the tertiaries, and faintly spotted. Wing coverts, mostly old winter feathers, the few new ones being barred like the tertiaries, the yellow being somewhat duller. Primaries and secondaries, same as in winter.

Of these three birds, No. 1 exhibits the greatest amount of gloss on the feathers. No. 2 is the largest and possesses the best developed "ruff," the feathers of which are very long, curved,¹ and wavy. Some of the feathers are moderately

¹ Some of the "ruff" feathers measured $2\frac{1}{4}$ inches.

glossy. No. 3 is the smallest. Its "frill" is least developed, and the feathers show almost no sign of gloss. The importance of these facts will be discussed presently.

The ground is now somewhat cleared, so that an attempt may be made to answer two much vexed and contended questions. 1. For what function is the "ruff" or "frill" developed? 2. Why are its feathers of such rich and varied colours in different examples? The first question has been fully dealt with, and in connection with it many explanations have been offered. When Darwin first enunciated in a definite way his theory of Sexual Selection¹ he took the Ruff among other birds as a typical example to illustrate the "Law of Battle." The males (polygamous in nature like many gallinaceous birds) fight for the possession of the females. Space does not permit me to describe the combat.² Suffice it to say that the neck feathers are erected resembling a shield, which is supposed to protect the more tender parts. The shield-like function of the "ruff" feathers has been pointed out by Montagu, subsequently mentioned by Darwin, and advocated by others. But that this is not the main function of these feathers is shown by the following facts:—

Firstly.—The nature of the "frill" feathers. They are soft, wavy, and offer but little protection.

Secondly.—Their position. Assuming even that they protect *tender parts*, some of the most vital parts are exposed to danger, for the shield is absent over the head and face and wattles, regions which in other fighting birds are frequently injured.

Thirdly.—According to Montagu every feather, as well as those of the "frill," is more or less distended. Hence it is likely that the cause of this general erection is one simply of anger or excitement.³

Fourthly.—Ruffs fight at other times of the year. Why are they not always protected by a neck shield?

¹ "Descent of Man," p. 360.

² Macgillivray, "Hist. Brit. Birds," vol. iv., 1852. Also Yarrell "British Birds," vol. iii., p. 427 to 434; and other standard manuals.

³ J. T. Cunningham points out that erection or display of feathers is often invariably associated with excessive development. (Sexual Dimorphism, 1900, pp 108-154-155.)

Fifthly.—According to Montagu, Ruffs seldom injure each other. This is not because the shield protects them, for the parts *exposed* are seldom scratched. It is because the beak is soft and weak, like that of other waders and so incapable of inflicting a severe wound. Hence the possession of a shield is unnecessary.

Lastly.—If the “frill” only functioned as a shield why should it possess such rich, handsome, and varied colours?

The probable function of the modified neck feathers is to serve as an ornament, as already pointed out by Darwin and others. This brings us on to the second question, viz.: For what reason is the “frill” and, indeed, the nuptial plumage generally so rich and variable? It is now generally believed by many observers that most female animals, including birds, exercise a certain amount of choice in the selection of their mate. Darwin lays stress on the fact that the more highly ornamented males are those more often selected. Hence if we assume that the female Ruff is particularly fastidious in her choice, then by a process of sexual selection not only might the colours of the males become highly ornamental, but even the feathers might tend to vary in colour. But this is an *a priori* argument, and is only begging the question. We have no evidence of the female Ruff being more particular in her choice than any other birds of the same sex. However there is evidence to show that it is not the victorious conqueror that is chosen by the female,¹ inasmuch as the battle between the male Ruffs generally ends in a scoreless draw, and so, I think, we are safe in assuming that in the case of Ruffs the female exercises her sense for the beautiful, and selects the most ornamental and vigorous looking male. It might be asked, why do the males fight when the females are more numerous? For two reasons: firstly, the females only choose certain males, and so the latter sex enter into a competition of warfare to “cut each other out.” Secondly, although the males are actually less numerous than the females, they have no objection to any number of wives (polygamy), and so fight among themselves to attain this end. Thus, through the females exercising their selective powers, the male descendants have kept up the richly-ornamented nuptial plumage. So

¹ Differing in this respect from many gallinaceous birds.

much for the evidence being in favour that the "frill" is ornamental in function. But we still ask, why do these ornamental feathers vary so much? Without making any assumptions this question is a most difficult one to answer. Wallace points out that constancy of colours may be explained on the principle of protective colouration. The females require this more for hatching, &c. Hence they are more sombre plumed. Hence we may argue that where protection is actually unnecessary and even injurious in the economy of nature, coloration may become inconstant and even varied. This is, in part, advocating Stolzmann's¹ views. According to him it is often advantageous that many male birds be destroyed by their natural enemies, more especially if polygamous, because the females, when hatching, may be disturbed by a male which has not found a mate. Now, inasmuch as the male Ruffs seldom injure each other in battle, and so their numbers are not diminished, and moreover they aspire to keeping many wives, I maintain that the result must be that many males never get the chance of mating. Hence in reality, in the economy of nature there are a number of superfluous males. They require to be destroyed, and so natural selection, which only attends to the preservation of species, ceases now to act. Thus the male plumage, no longer conservative in colour for any protective purpose, may undergo a considerable amount of variation. It is worth suggesting that age may also have something to do with the variation in the nuptial plumage. The excitable, highly-strung, polygamous nature of Ruffs may have brought about a plumage change comparable to what takes place in a much less marked degree among other waders normally as age advances.

Thompson² states that when visiting the London Zoological Gardens, Regent's-park, in 1833, the Keeper, Mr. Hunt, informed him that a bird in captivity for two or three years assumed a different "ruff" each summer. Mr. R. Ball noticed the same in the Dublin Zoological Gardens. He states that a Ruff received in full plumage changed twice. Montagu and Bartlett,³ on the contrary, maintain that the nuptial plumage

¹ *Proc. Zool. Soc.*, 1885.

² "Nat. Hist. of Ireland," vol. ii., p. 233.

³ Yarrell "British Birds," vol. iii., p. 433.

never varied in confinement. Thesetwo conflicting statements are most interesting. I should not lay so much stress on the fact that some Ruffs *retain* the same nuptial plumage. Some birds in captivity never even assume their nuptial plumage at all. This is due no doubt to captivity affecting their reproductive system. A case in point is that of a Knot¹ (*Tringa canutus*) at present in the Dublin Zoological Gardens, which throughout, the year has retained its winter plumage. On the contrary I have observed gulls in captivity change from winter to summer plumage with great rapidity. Hence it appears that observations made on plumage changes of birds in captivity hardly gives up a true insight as to what happens in a state of nature.

Judging from analogies and comparisons, I am inclined to think that the three types of Ruff already described (pp. 200–2) represent three different ages between which slight variations may occur. Those with the yellowish-white frill may be the youngest²; for they are the smallest, have the “frill” least developed, and show almost no gloss on the plumage.

The reddish-brown birds are probably older; they are, on an average, larger, have longer and better developed “ruffs,” and show a moderate amount of gloss on the feathers.

The oldest birds are likely those which display a predominating amount of black in their feathers. They are the most glossy, and increasing lustre of feathers indicates increasing age. This is seen in many of the Crows, Ducks, Pigeons, Gallinaceous, and other groups of birds. If comparison helps us we may say that the dark colour in the Limicolæ is an indication of age. In some species—notably the Dunlin and Sanderling—the old, and often barren, birds lose much of the buff shading of their summer dress, its place being taken by a greater amount of black feathers. What exact ages these types may represent it is hard to say. The question requires further investigation, and I only throw out my suggestions in the hope that they may help others to lead to more definite results.

¹ Mr. Bartlett noted the same thing happening many years ago in the London Zoological Gardens. (See Darwin, “Descent of Man,” p. 399).

² The young male mentioned by Montagu in Thompson’s work had a “frill” of white and chestnut.

The rich and varied coloration of the nuptial plumage may in part be accounted for in yet another way. Headley¹ points out that pigments in animals are waste products derived from the food. In the breeding season these are discharged more freely than at other times of the year, owing to increased katabolism² of the organism. This is seen by the intensifying of the colours of the feathers, in the spring, of such birds *which neither actually change colour or grow new feathers*.

Now, granting that the pugnacious Ruff is a highly-strung, excitable creature, especially in the breeding season, it may be that the katabolic changes which then take place are, perhaps of greater extent than what occur in other birds, and so with a copious discharge of waste pigment, not only rich, but even varied, colours would be produced.

Habits of Life.—So much has been written upon this part of the subject that I do not intend to enter upon it. Many people are aware of the eccentric conduct of the Ruff during the breeding season. I have already incidentally referred to the polygamous and pugnacious habits of the males; but a fuller and more interesting account of the combats for the females with descriptions of the *battle-fields* may be found in the standard works of Yarrell, Saunders, Thompson, Watters, Seeböhm, &c. The observations of Cordeaux³ are well worthy of perusal. He points out a thing which should be of considerable importance to taxidermists, namely, that, considering the length of the legs, Ruffs are by no means high standing. They bend the tibio-tarsal joint to a great extent, and carry the body horizontally. I must say that I agree with these observations, and I even noted the same attitude assumed by Ruffs in captivity. How often do we see Ruffs stuffed in an erect standing position, set up like a pouter pigeon, and looking most unnatural.

I have never heard the Ruff make any noise, and this, together with the low attitude which it assumes, sometimes makes it a little difficult to identify this bird on the mud-slob, as in the distance it may be mistaken for a plover. The Ruff

¹ Structure and Life of Birds, 1895, p. 315.

² Constitutional changes of a destructive character.

³ The Ruff and Reeve in Lincolnshire, *Zoologist*, 1890 (pp. 204-209).

usually flies low and rapidly, but sometimes it ascends to a considerable height.

According to Yarrell this bird formerly bred in Somersetshire, Cambridgeshire, Huntingdon, Norfolk, and Lincolnshire. According to Thompson there is no record of it as having bred ever in Ireland or Scotland. The Ruff has practically ceased to breed now in the British Isles. R. J. Howard¹ thinks they bred in Lancashire as recently as 1884.

General Geographical Distribution.—The Ruff nests as high north as 75° N. lat., in Siberia, Scandinavia, and Russia; and according to Saunders it breeds also in Poland, Germany, Holland, Belgium, and N. France.

When migrating it is widely distributed over Europe. It winters from the south of the Mediterranean as far as Cape Colony, also in Southern and Eastern Asia.

An interesting note on the nesting habits of the Ruff on the Munio River (the natural Russian-Swedish frontier) is mentioned by Sutton Davies.² He says—"The Ruff was very numerous in the marshes round Kaaresuando, where we obtained eggs.³ As one lay watching the birds in the marsh they would keep passing and repassing over our heads, uttering a low croak." We have seen that usually the Ruff is quite silent.

Food.—According to Yarrell the natural food consists of insects, their larvae and worms, mixed with fine gravel. Collet found seeds of a sea-shore plant in birds shot in autumn near Christiania. Stevenson found in the stomach small bronze winged beetles and earwigs.⁴

Cordeaux⁵ noted Ruffs in company with young Curlew feeding on the dried dung of the Great Cotes Marshes (Lincolnshire). He maintains that in the dry season these birds live chiefly on coleopterous insects obtained in this locality. T. E. Gunn found in the stomach remains of insects and fibrous substance, and in the gullet a caddis-worm with an entire case.

¹ *Zoologist*, 1884, p. 467.

² *Zoologist*, 1895, p. 326 to 335.

³ Four constitutes the clutch. Colour of eggs is greyish buff, blotched and spotted with reddish brown (Payne Galloway).

⁴ See Norgate on "The Food of Birds," *Zool.*, 1881, vol. v., 3rd series, p. 411.

⁵ *Zoologist*, 1884, p. 446.

In another bird he found remains of insects and seven or eight pebbles in stomach.

Dr. Scharff, who very kindly examined the stomachs of Ruffs which I submitted to him, reports as follows:—"Constituent contents are—

Gravel, largest pebble measuring 4 mm., average being 2 mm. Sand, with a great many remains of Gasteropod shells, probably marine. Bits of vegetable substance like marine algae, and very minute seeds of plants. Setae, probably of marine worms."

The Gasteropod shells, detected by Dr. Scharff, confirms my idea that Ruffs feed, at any rate in part, upon Mollusca, in addition to worms, insects, and vegetable substances. The Ruff is considered a very edible bird. This we should expect on account of the mixed food it eats, and also because it is found inland and hence is not exclusively a *sea-shore* bird. However, judging from the immature birds, which I have myself tasted, I must candidly admit that I should prefer to eat bird flesh with a less pronounced flavour of brine and fish.

CONCLUSION.

Time and space do not permit me to enlarge further on the subject of my paper. I have laid down my remarks with a two-fold object, viz., to put together as much information as is practically known of the Ruff as an Irish bird. For this end I have collected together all the occurrences of this bird in our country for many years back. Secondly, to try and make the subject matter of my paper readable to not only the specialist in ornithology but even to those who may be interested in general natural history work without any preference for a special branch of the subject. For this end I have not omitted to deal with speculative ideas and theories as a means to help us to understand how special structural modifications have been brought about correlated with the particular temperament and modes of life of the bird in question.

I wish to express my best thanks to Mr. Warren, Mr. Ussher, Mr. Barrington and Mr. Williams for their kind aid and suggestions on the subject, also to Dr. Scharff and Mr.

Carpenter for so kindly allowing me to examine many skins in the collection of the Science and Art Museum.

RECENT LITERATURE.

- CAMPBELL, . . . Ruffs at Inch, Lough Swilly (*Irish Nat.*, vol. i., p. 195).
- BARRETT-HAMILTON, Ruff in Co. Wicklow (*Irish Nat.*, vol. iv., p. 296).
- PATTEN, . . . Sea Fowl of Dublin Coast (*Irish Nat.*, vol. viii., p. 225).
- WARREN, . . . (a) Ruff in Co. Sligo (*Zoologist*, 1884, p. 429).
 „ „ (b) (*Zoologist*, 1896, p. 384).
- PAYNE-GALWEY, . . . Letters to Young Shooters (1896, p. 439).
- SAUNDERS, . . . Manual of British Birds (1899, p. 599-600).
- LIFFORD, . . . *Zoologist*, 1896, p. 51).
- CORDEAUX, . . . The Ruff and Reeve in Lincolshire (*Zoologist*, 1890, p. 204-209).
- HOWARD, . . . Breeding of Ruffs in Lancashire (*Zoologist*, 1884, p. 467).
- DAVIES, . . . In quest of Birds on the Munio River (*Zoologist*, 1895, p. 326-335).
- NORGATE, . . . Food of Birds (*Zoologist*, 1881, p. 411).
- CORDEAUX, . . . *Zoologist*, 1884, p. 446 and 466.
- WALTERS, . . . Fauna of Outer Hebrides (*Zoologist*, 1896, p. 142).
- HARTING, . . . Ruff in Winter in Sussex (*Zoologist*, 1895, p. 150-151).
- CUNNINGHAM, J. T., . . Sexual Dimorphism (1900, pp. 108, 154, 155).

EXPLANATION OF PLATE 6.

Map of Ireland showing counties shaded from which Ruffs have been recorded from 1821 to 1899. The horizontal shading indicates counties in which the Ruff was known previous to 1853. Only three of the maritime counties (Louth, Meath, and Leitrim) are yet without record of the bird.

Trinity College, Dublin.

NOTES ON IRISH CETACEA.

BY R. LLOYD PATTERSON, F.L.S.

THE perusal of Mr. Beddard's recently published "Book of Whales" led me to re-read Dr. Scharff's article on this subject in the April number of the *Irish Naturalist*; and to endeavour to further elucidate a little-known subject I have referred to my notes, and think the following may be considered of sufficient interest to justify its insertion in the same Journal. Omitting anything that has already appeared in my book on "The Birds, etc., of Belfast Lough," and coming to more recent years, I find in my fishing notes of 1892 to 1897, both included (I have none since) numerous references to the Cetacea. The Porpoise is of almost daily occurrence, and need not be further mentioned. Three others, namely, the common Beaked (better known as the Bottle-nosed) Whale, *Hyperoodon rostratus*; the Ca'ing, or Pilot Whale, *Globicephalus melas*; and the Rorqual, *Balæonoptera musculus*, occur, I may say, every autumn; and I have occasionally seen all three here in one day, the first and last-mentioned generally singly the others sometimes singly, but also sometimes in small "schools" of from two or three up to four or five or so together. They can be distinguished by the different shape of the heads—the "beak" of the first-mentioned, the blunt, rounded front of the second, and the flat-topped head of the third being distinctly seen when the animals come to the surface to breathe or to attack a "ball" of fry. I have numerous and some interesting notes of them—one to the effect that I have no doubt the two larger species sometimes *look round them* in a leisurely manner when they come to the surface; for I have often observed them change the direction of their course and go straight to a "play" of birds over a "ball" of fry, towards which their attention had been directed when on the surface, by sight or sound, or both, of the birds hovering and crying over and dipping on the fry.

If they rise pretty near and to windward a strong fishy odour is very evident.

Besides the above, I think Sibbald's Rorqual may also occur here. I had remarked that I had never seen any of these creatures either "broaching" clear of the water or "peaking the flukes," as the Sperm Whale does on going down; but I have noted, under date 22nd June, 1895, having sailed over to near Portpatrick, on returning, and when in about mid-channel, "a large whale 'broached' clear of the water near the boat." Unfortunately I did not see it in the air, but heard the tremendous splash it made, and saw the effects of it in spray and small waves on its returning to the water.

In reply to my inquiries the boatman declared it was "three times the length of the boat and about as big as her in the body," which would have given it a length of some 102 feet and a girth of nearly 30! But on my declaring these dimensions impossible he said, "Maybe it was not more than twice the length of the boat," which would have made it 68 to 70 feet long, below which estimate he would not come! My own note adds, "The splash I saw might have been 50 feet long, possibly considerably more."

I have no doubt that the Killer, *Orca gladiator*, sometimes visits our waters.

Under date 20th August, 1895, I have noted:—Saw a large Rorqual several times, then two, and a Pilot Whale, and, I believe, a Killer. I have occasionally had three large Rorquals in view at once, and considered there were five or six in the Bay at the time. These seemed to be about 30 to 40 feet long, and I have occasionally seen them fully 50 feet. The Bottle-nosed Whales were estimated at 20 to 30 feet, and the Pilot or Ca'ing Whales at 10 to 15 feet. Of late years the Rorqual is seen here more frequently than the Bottle-nosed species.

An interesting note of a much rarer species is under date 8th December, 1895, when "My nephew, Mr. Egmont Praeger, told me of a strange Cetacean having been cast ashore just beyond Rockport Quay" (*i.e.*, between two and three miles from here), on the Co. Down shore of the bay. Accompanied by General Sir Henry Geary, K.C.B., and his son, I went to see it the following day, and examined and measured the animal. I found it to be a Bottle-nosed Dolphin, the *Delphinus tursio*

of Bell and Southwell, the figure of the animal given by the latter author on p. 124 of his "Seals and Whales of the British Seas" being very good, except that the dorsal fin is rather too pointed.

The dimensions of this very rare visitor were about as follow, strict accuracy being difficult owing to the mutilated condition of the creature when seen by me :—

Length (in a straight line),	. . .	10 ft. 6 in. to 9 in.
Tail, broad,	2 ft. 2 in.
Flipper, long,	1 ft.
Do., broad,	0 ft. 4 in.
Girth, about,	5 to 6 ft.

The attenuated beak had a gape of mouth of about 9 in., and about 3 in. more showing, but not open, inside the cheeks. The lower jaw was slightly the longest. The colour was slate above; under jaw, breast, and remaining underparts dull white. I paid it a second visit the next day, after referring to my books and to confirm previous observations, and found nothing to add. I sent down the next day to secure the head, but it had unfortunately been removed and the body cut up.

Holywood.

NOTES.

BOTANY.

Flowers and Insects.

I am much interested in Mr. C. B. Moffatt's remarks on the fertilization of *Orobanche major* and other flowers by wasps. Noticing how other visitors are kept by these insects from the flowers of *Scrophularia nodosa* during the day, on one occasion I watched some plants of that species at night, and found them abundantly visited by several of the common Noctuid moths. It may be doubted whether these are useful in the pollination of the flowers. I have seen them visited also by a few small Diptera, which certainly are of no service to them.

W. E. HART.

Howth.

ZOOLOGY.

MOLLUSCS.

Hydrobia Jenkinsi, Smith, in South-east Ireland.

On May 20th last, during an afternoon stroll, I discovered this interesting little mollusc occurring in abundance for a couple of miles along the marshy banks of the River Barrow at New Ross (Counties Wexford and Kilkenny) in company with *Limnaea truncatula* and *Succinea elegans*.

The specimens I collected are all smaller and less pointed than usual in Irish and English specimens, but otherwise seem to agree with the type, though Mr. Lionel E. Adams, who has kindly confirmed my identification of the species, states that he noticed traces of carination on one or two.

R. A. PHILLIPS.

Cork.

The Food of Trout.

The angler's complaint against the use of the turbine water-wheel may be just or otherwise. There are other matters that might claim his attention, viz., the food of the fish. I have conversed with many anglers, and few of them know more than that a certain artificial fly will kill Trout under favourable atmospheric conditions, and that they readily take worms during a flood. How few consider upon what the fish live during the entire year. I have examined some rivers with works and mills upon them, and have failed to find many shell-fish that are plentiful in adjoining streams not so polluted. In this connection I would point out that in the stomach of a Trout little over one pound weight, I found 100 shells of *Limnaea peregra*, our commonest fresh-water snail, and over 130 small *Pisidium fontinale*, and *P. pusillum*. Anything that is detrimental to the creatures upon which the fish live must affect them in a corresponding degree. Would our fishers become naturalists, not specialists, they would enhance their pleasures.

H. L. ORR.

Belfast.

BIRDS.

Spring Migrants at Poyntzpass.

As might be expected many of the birds were late in appearing this spring; the Chiffchaff was here on March 31st, but from that date till April 15th there was no further token of its presence; the Willow Wren arrived on April 20th, the Corncrake on April 24th, the Swallow on the same date, the Cuckoo on April 28th, and I saw the first Swift on the following day. None of these birds however were present in any number till May.

W. F. JOHNSON.

Poyntzpass.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Linnet, a Canary, and a Goldfinch from Miss Williamson, a Monkey from Mr. A. Gore, and a Kestrel from Mr. J. B. Norris Kane.

19,405 persons visited the Gardens in June.

BELFAST NATURALISTS' FIELD CLUB.

MAY 12.—The summer session was inaugurated by an excursion to Saintfield. The extremely wet and otherwise unfavourable character of the day tested the zeal of the members, so that the party met at Saintfield by the Rev. C. H. Waddell, B.D., was small, yet it included several ladies, and all walked direct for Creevy Lough. There is an ancient artificial island, fortified residence, or crannoge in the lake, which is still in a fair state of preservation. The Creevy Rocks above the lake are associated with the events of '98. The day was not favourable for botanical investigation, yet some notes were taken. The pretty Marsh Violet was in flower, and the Bog Bean was just beginning to put forth its racemes. During the hour spent in the rain by the lake shore sixteen or eighteen species of shells were collected, the best being *Valvata cristata*. After a steady resistance, the party were at length baffled by the severity of the weather, and returned in good order to the vicarage, where they found shelter and hospitality, dispensed by Mrs. and Mr. Waddell, which were thankfully acknowledged at the formal meeting, presided over by the vice-president, Mr. W. H. Phillips, at which also some new members were elected, and then the party returned to Belfast.

CORK NATURALISTS' FIELD CLUB.

JUNE 4.—EXCURSION TO INCHIGEELA.—The party, numbering twenty-seven, travelled by train to Macroom. From Macroom the party took coaches and drove to Inchigeela. The following plants were observed and collected:—*Ranunculus Lenormandi*, in roadside pools. *Aquilegia vulgaris* and *Linum angustifolium*, abundant in meadows. *Viola ericetorum*, along the edge of lake. *Geranium columbinum*, *G. lucidum*, and *Arenaria trinervia*, roadside. *Saxifraga umbrosa* and *Sedum anglicum*, plentiful on rocks. *Carduus nutans*, found by Mr. Johnson on rough ground near the lake. *Lobelia Dortmanna*, abundant in the lake. *Lithospermum officinale*, roadside, near Toom Bridge. *Pinguicula grandiflora*, in every boggy spot. *Euphorbia hiberna*, in many fields. *Potamogeton lucens*, *Nitella flexilis*, and *N. opaca*, dragged in lake. *Cladium jamaicense*, *Carex fulva*, *C. filiformis*, *C. flava*, *C. binervis*, and *Scheuchzeria palustris*, along the boggy shores of the lake. At 5 o'clock the party partook of tea at the Lake Hotel, and once more taking coach, returned towards Macroom, arriving in Cork at about 8.30.

THE IRISH SPECIES OF LAND PLANARIANS.

BY R. F. SCHARFF, PH.D., M.R.I.A.

THE recent publication of Prof. von Graff's magnificent monograph on the assemblage of worms known as "Land Planarians," gives me an opportunity of reviewing this group as far as we are concerned in Ireland. Anyone who wishes to obtain additional information on the subject of these remarkable flatworms can see the original ("Monographie der Turbellarien," part ii., 1899) in the National Library of Ireland. Until recent years a few species only of land planarians had been discovered, though many marine and freshwater species were known to science. Prof. von Graff now makes known to us some hundreds of species of land planarians, of which however only seven have hitherto been found in Europe. Most of the others are confined to the warm and moist tropical forests. In shape they are much flattened from above downward, so that some of them are leaf-like; others more elongated, might be described as ribbon-like, and a few are more or less cylindrical. A distinct head is never recognisable, but there is always something to mark off the anterior from the posterior end. Minute eyes are nearly always present, and sometimes the anterior end has a different shape from the posterior. The mouth is usually placed some distance back on the ventral surface.

Only seven species of land planarians have been recorded as European, but I was so fortunate as to discover another in the Pyrenees last autumn, which has lately been described in the *Proceedings of the Linnean Society*. Probably all the land planarians are carnivorous. Their presence need not therefore be dreaded by owners of greenhouses in which they may make their appearance. On account of their underground habits, these worms have only a very restricted range, and their natural means of dispersal must be exceedingly limited. To students of the geographical distribution of animals they are therefore of particular interest. Now as regards the Irish species, there are only three, one of which moreover is probably introduced, viz. :—*Placocephalus* (*Bipalium*) *Kewensis*.

Placocephalus kewensis (Mos.)

(Fig. 1.)

This species, which is better known under the name of *Bipalium kewense*, was first discovered in the greenhouses at the Botanic Gardens of Kew, near London, in 1878. It grows to over a foot in length, though those I have seen have never exceeded 6 inches or about 15 cm. The anterior end is a semicircular flat disc much like the shape of a cheese-cutter, while the body is narrower and very elongated. The colour is somewhat variable, but as a rule it is greyish above with five darker longitudinal stripes, and lighter underneath.

Since its original discovery it has been taken according to von Graff, in several conservatories in England and Germany. It has also been found in Madeira, at the Cape, in North America, Brazil, Hong Kong, Samoa Islands, Australia, and New Zealand.

It has been first found in Ireland by Major Barton in his greenhouse at Straffan, Co. Kildare (*Irish Nat.*, vol. iii., p. 242). More recently Mr. Moore took it in the Glasnevin Botanic Gardens near Dublin (*Irish Nat.*, vol. iv., p. 165), and he has since forwarded specimens from there to the Museum from time to time. Prof. von Graff (p. 272) inclines to the belief that the Oriental Region is the original home of *P. kewensis*, and that it has thence been introduced by human agency to other parts of the world. He also refers the centre of origin of the *Bipaliidae*, (p. 272)—the family to which this species belongs—to the Indo-malayan sub-region, five-sixth of the known species being confined to the Oriental Region.

Rhynchodemus terrestris (Müll.)

(Fig. 2.)

This was the first land Planarian ever discovered, though by its original describer, O. F. Müller, it was taken for a slug. This is however not surprising, as even to the present day many who see it for the first time would certainly classify it among the Mollusca. It is about an inch long, the anterior and posterior ends being cylindrical, the middle part slightly compressed. Above it is dark grey, underneath light grey, and during its progress it leaves a track of slime behind precisely like a slug. It probably feeds upon snails—at any rate I once found a specimen in Switzerland half immersed in the shell of a *Hyalina*.

I first observed it in Ireland in 1894, when the late Miss Kelsall brought me a specimen from Blackrock, Co. Dublin (vide *Nature*, vol. 1., p. 617). Since that year I have taken it near Carlow, at Woodford and Clonbrock, Co. Galway, at Kenmare and Parknasilla, Co. Kerry, at Mallow, Co. Cork, near Dundalk, Co. Louth, and at Tempo, Co. Fermanagh, while Mr. Halbert took a specimen at Brittas Bay, Co. Wicklow, and another at Leenane, Co. Galway, for the Royal Irish Academy Fauna and Flora Committee. The little worm prefers damp and shady places, and generally shelters under stones or rotten wood.

In England it seems widely distributed. It was first taken by the Rev. L. Jenyns, near Cambridge. Additional localities are given by Sir John

Lubbock, and more recently Mr. Gamble recorded it as far north as Westmoreland. I took it myself near Coniston in Cumberland, but so far as I know it has never been met with in Scotland.

Abroad it has been taken in Denmark, Germany, Holland, Austria, France, Switzerland, and the Balearic Isles.

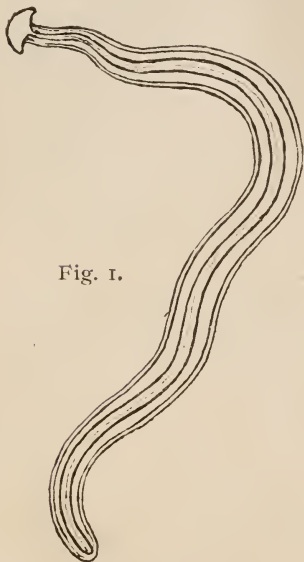


Fig. 1.



Fig. 2.



Fig. 3.

Fig. 1. *Placocephalus Kewensis*; Fig. 2. *Rhynchodemus terrestris*;
Fig. 3. *R. Scharffi*. Natural size.

***Rhynchodemus Scharffi*, v. Graff.**

(Fig. 3.)

The third Irish species, like the last, was first discovered by the late Miss Kelsall in her garden at Blackrock, Co. Dublin. She handed it to me, saying that she found a sickly-looking worm, which description quite agrees with its yellowish flesh-colour and flabby condition. I recognised it as a new species, but knowing that Prof. v. Graff was then working at his great monograph, I forwarded the specimen to him. A full description of its external and internal anatomy with figures now appears in the work referred to. The largest of the specimens I have seen measured about $2\frac{1}{2}$ inches (65 mill.), in length, and about $\frac{1}{4}$ th inch (3 mill.) in width. The lower surface is somewhat lighter than the upper, and, like the last species, it has two small eyes near the anterior end.

Rhynchodemus Scharffi is closely allied to *R. terrestris* and also to *R. pyrenaicus*, but differs from them both in several important structural points. Its size and colour distinguish it at once from *R. terrestris*

Prof. v. Graff agrees with me that this species must be considered as one of the endemic European forms, and it seems to me highly probable that it is indigenous in Ireland. It has recently been discovered in a second locality in Ireland by Mr. F. W. Moore at the Glasnevin Botanic Gardens near Dublin. The fact of the occurrence of this worm in both instances in an artificially heated structure does not necessarily favour the view of its introduction from abroad. All land planarians thrive best in a warm damp climate, and while they generally remain hidden under stones or clods of earth so as to avoid the sun's rays and drying winds, whenever they accidentally find their way into greenhouses, they meet there with conditions congenial to their nature without having to seek shelter. They are thus more easily noticed by us. I think *R. Scharffi* has been introduced into both the localities where it has yet been found, but it seems to me probable that it has come with the turf or perhaps with Sphagnum moss which are so largely imported from the country.

It is to be hoped that this short note will induce naturalists in various parts of Ireland to pay particular attention to this group of worms, as it is not unlikely that other species may still be discovered.

Science and Art Museum, Dublin.

BOTANICAL NOTES FROM NORTH IRELAND.

BY J. H. DAVIES.

THE chief purpose of the following is to place on record an additional station for *Epilobium roseum* and another for *Poa compressa*, two plants to which I have lately been led to give some attention. Though denied a right to native citizenship, it is gratifying to know that they are not outcasts from the Irish list. Without wishing it to be thought that I have formed a fixed conviction on this question, I may say I still cling to the opinion that the considerations in favour of the unqualified admission of both species are hardly outweighed by any that I conceive can be urged against.

Our knowledge of the range of these plants in Ireland I think is not yet complete.

Lepidium campestre, R. Br.—In extraordinary profusion on rocky ground (carboniferous limestone) on the County Armagh side of the River Blackwater at Benburb.

Epilobium roseum, Linn.—In July last I gathered examples of this Epilobe on a wall and in damp copses in the demesne at Lurgan, Co. Armagh. Although recorded in the *Cybele* for only Districts V. and XII., the editors are doubtless right in noting the plant as questionably rare. Its superficial similarity to *E. montanum* is so very close that it may most easily be passed over.

Cnicus arvensis, Hoffm., var. **setosus** (Bess.)—In some plenty in waste ground by a roadside at Lambeg, Co. Down. When seen growing there is a conspicuous difference between the variety and the type. To my mind Sir J. D. Hooker would seem to be quite justified in placing the plant as a sub-species. It is given in *Cyb. Hib.* for District XI. only. Mr. Stewart gives me a note stating that this plant was found by Miss Knowles and himself in a disused gravel-pit by the road from Kilrea to Garvagh, Co. Derry, July, 1898.

Scrophularia aquatica, Linn.—Though locally rare in Ireland it appears to have a wide range, and has been recorded from all the botanical districts, with the exception of District X. The blank is now filled through the occurrence of the species, in some plenty, by the margin of the lake in the demesne at Lurgan, Co. Armagh, where it has been observed, independently, by Mr. Richard Hanna and myself. At the same place there is abundance of *Eleocharis acicularis*.

Polygonum minus, Huds.—In August, I met with this species, for which *Cybele* gives no Co. Antrim locality, in quantity on a gravelly part of Lough Neagh shore, about half-mile west of the Sixmile-water. The station at Whitehouse, given in *Flora of Ulster* and accepted in *Flora N.E. Ireland*, may, after all, have been right.

Potamogeton Zizii, Roth.—Occurs in a watercourse between the canal and the River Blackwater at Benburb, and also in the Callan Water, Co. Armagh.

Eleocharis uniglumis, Link.—Mr. Stewart's only station for this plant in the North-east (near Bangor, Co. Down, 1867) has been lost through building. It has, however, been found to occur on the muddy sea-shore at Groomsport, where I met with it in July last, in considerable quantity. The only other north-eastern locality is Killough, in the same county.

Carex paludosa, Good.—Being one of the rarest of our north-eastern sedges, not recently seen in District XII., it may be worthy of note that it has lately been found in marshy places along the greater part of the County Down shore of Lough Neagh. At the same time I saw it also, but in lesser quantity, on the County Armagh shore of the Lough, near the junction of the two counties.

Poa compressa, Linn.—On a wall by the roadside at Ballyvorally, about midway between Glenavy and Lough Neagh, Co. Antrim. The grass was found here on the excursion of the Belfast Field Naturalists' Club, 4th August. Some time ago the prediction was hazarded that it would prove to be more widely diffused than was then known, and it will most likely be heard of from still other places.

A VISIT TO LOUGH ERNE IN SEARCH OF THE
SANDWICH TERN.

BY ROBERT WARREN.

My friend, Mr. R. J. Ussher, having heard from Mr. C. Langham, of Tempo Manor, that he had received from Lough Erne four young Sandwich Terns for his collection of live birds, requested me to visit Lough Erne and verify the discovery, as he was anxious to be certain of the terns breeding there, because up to that time only one breeding-haunt in Ireland was known to us, that of Rathroueen Lough near Ballina, Co. Mayo. However, from Mr. Langham's description of the birds, and his acquaintance with the species, from previously having shot specimens in Donegal Bay, I had no doubt of his correctly naming the birds sent him.

Intending to make Enniskillen my headquarters for exploring the lake, I left Ballina on the 9th July by the 1.45 limited mail train, and on reaching Clarendon Station, changed into the Waterford and Limerick train for Ballysodare, hoping to meet at that station the Sligo and Leitrim train for Enniskillen but, unfortunately, just as our train was nearing the station, the one for Enniskillen was steaming out. So I had to go on to Sligo for the night. I left next morning by 6 a.m. train for Enniskillen, arriving there at 8.30, and after breakfast left by the Dundalk 9.30 train for Lisbellaw, where Mr. Langham very kindly had a car waiting to take me on to Tempo Manor, which I reached after a pleasant drive of five miles through a pretty and thriving-looking district.

Tempo Manor is the ideal home of a naturalist, a picturesque, handsome residence in a fine demesne, planted with fine old timber, with a beautiful little lake surrounded by trees and shrubs at the foot of the lawn. The lake is well-stocked with wild fowl of various kinds: Grey-lag, Bean, Whitefronted, Barnicle, Canada, and Egyptian Geese, while the ducks are well represented by Sheldrakes, Wild Ducks, Wigeon, Teal, Gargary, Shovellers, Tufted Ducks, and American Summer Ducks. Lesser Blackbacked Gulls, Herring, and Blackheaded Gulls were in a separate enclosure from the ducks, along with a pair of Green Cormorants.

In a large aviary close to the lake were four healthy young Sandwich Terns, a Grey Plover, and some young Blackheaded Gulls, as companions for the Terns, while in a part of a little shrubbery, enclosed by an iron netting, but uncovered, near the lake, lived two pairs of the New Zealand Weka Rails, so tame and domesticated that they reared several young birds, some of which I saw were as large as their parents, and equally tame.

The upper part of the lawn was tenanted by White Storks, and a remarkably handsome specimen of the Crowned Crane, while Silver Pheasants ran about the grass near another large aviary, containing a pair of Ravens, Grey Crows, and specimens of the Tawny, Long-eared, Barn, and Short-eared Owls, and an Australian Piping Crow. Altogether, it was the most interesting private collection of living birds that I ever saw, and all looking so healthy as to do the greatest credit to their management.

In a room used as a museum, Mr. Langham has a fine collection of native birds, nicely arranged in a large central case, and a number of smaller ones round the room. Among the birds I noticed a fine specimen of the Iceland Gull in that very white phase of plumage common to both Glaucous and Iceland Gulls in the last season before assuming the perfect plumage of the adult. This specimen was the whitest I ever saw, not a trace of the pale grey mantle on back or shoulders, but this extreme whiteness of colour was probably owing to the lateness of the date when the bird was obtained, Mr. Langham having found the bird dead on the Mullaghmore sands on the 5th June, 1896. After passing a very pleasant day I returned to Enniskillen, intending next morning to go out on the lake in search of the Sandwich Terns' breeding haunt.

When passing Lough Eyes, a small lake on the roadside between Tempo and Lisbellaw, I observed a young Great Crested Grebe swimming near a little island; it appeared full-grown and well able to fly across the lake, and on mentioning the fact to Mr. Langham, he told me that two pairs of Grebes bred on that small sheet of water. Next morning I went out on Lough Erne, and visiting the terns' breeding-haunt, found

about twenty pairs of old birds flying about the island, but they had apparently all hatched out their young, which had either fled out on the lake with the young Blackheaded Gulls, or concealed themselves among the weeds growing in dense thickets about the island. I found only one young bird a day or two old, two fresh eggs, and three addled ones. The young bird being required to finish a nest-case in the Dublin Museum, I killed it, and to my surprise when dying it disgorged parts of a sand-eel, the vivid green of the back and the silvery white colour of the under parts showing that it was unmistakably a sand-eel brought from the sea, a distance of at least fifteen miles, a long way for any bird to bring food for its young.

No doubt the Sandwich Terns may, like the common species, feed their young with fish from the lake, but I never saw any of them make the least attempt to fish while I was on the lake, although there were numbers of Common Terns fishing all round at the time. Among the breeding birds of the lake the Blackheaded Gulls appear to be the most numerous; there is a colony of Lesser Blackbacked Gulls on an island far down the lough, while the Common Terns breed on various islands.

The Tufted Duck is one of the commonest ducks breeding on the islands. We found two nests amidst the long reeds on the tern island; on one the duck was hatching five eggs, but the other was a deserted nest, containing three dead birds and five eggs. On another small island, frequented by Common Terns, we found a third duck's nest with four newly-hatched young, and five eggs chipped; one young bird was so strong that it scrambled out of the nest and swam out on the lake like an old bird; a fourth nest we found on another tern island, the female sitting so close on seven eggs that I almost trod on her before she rose from the nest. These nests all found without any special search being made show how common the Tufted Duck is on the lake, and when returning up the lake to Enniskillen we passed several broods swimming after their mothers, one with ten or twelve, another with seven, and a third with four little birds, all apparently the same size, and only two or three days old, which shows what late breeders these ducks are, even later than the Mergansers.

Tame swans are very common about the lake, nearly every little sheltered bay being tenanted by a pair and their young broods, five to six being the average number of cygnets I observed with each, but one pair I thought had seven. The many finely-wooded islands scattered about Lough Erne add greatly to the beauty of its scenery, but are very disappointing to the ornithologist. The dearth of bird-life in some of these old oak woods is remarkable, for where you would expect to hear the cheerful notes of the Chiffchaff or those of the rarer Wood Warbler, the silence of death reigns all round, with nothing to break it. I walked through one of these old oak woods for a long time, and the only appearance of bird-life that I saw was a solitary Woodcock rising out of the thickest part, and the only sound I heard was the flap of his wings.

In the evening, after returning to Enniskillen, I walked out to Castlecoole, Lord Belmore's beautiful place, to see the celebrated flock of Grey-lag Geese kept on the lake in the demesne there for over 160 years. According to William Thompson these geese had been brought there by Colonel Corry (ancestor of the present Lord Belmore), about 120 years before 1848. They are the true Grey-lag, and live nearly altogether on the lake in a half wild state. While looking at them swimming slowly about I counted twenty-three old birds, but saw no young ones, which probably were kept out of sight among the long reeds that fringed the lake. The flock, I was informed by one of the workmen, numbers about forty, and they would be more numerous only for the large number of goslings destroyed by the pike. This small lake is also a favourite breeding-haunt of the Great Crested Grebe, and while looking at the geese I observed eight grebes (old and young) on the water.

I was informed that on most of the lakes in Fermanagh the Great Crested Grebe breeds, wherever they are of any size. Lough Eyes, already mentioned, although but a small sheet of water, having two pair.

Moyview, Ballina.

ROUND LOUGH CONN.

BY R. LLOYD PRAEGER, B.E.

It might, perhaps, have been more in keeping with the times to have headed this narrative "How I climbed Nephin," especially in view of the fact that the ascent of this mountain was absolutely devoid of incident; but Lough Conn will be found to represent the centre of interest in the ramble described in the following pages, and may well stand sponsor for the whole. The necessity of filling up many gaps in the floras of West and East Mayo took me to that part of Ireland in the last week of July, and Ballina made a convenient and comfortable head-quarters, where salmon formed the staple article of diet. The main features of the surrounding district will be seen by a glance at a map. The river Moy flows northward through the town. Below Ballina it is tidal, and widens into an estuary, which in turn gives place to the broad waters of Killala Bay. At Ballina the river descends a series of limestone ledges like a flight of stairs, and for many miles above this fall it is deep and slow, flowing through great flat bogs. The Moy at Ballina separates West Mayo from Sligo, but a few miles southward Sligo gives way to East Mayo. All around Ballina the Carboniferous limestone prevails, but on either hand lie great areas of mountainous metamorphic country. Lough Conn, eight miles long by about three miles wide and (what is practically its continuation) Lough Cullen (three by two miles) lie on the edge of the limestone, west of the Moy; and close to the lake-shore the huge quartzite mass of Nephin (2,646 feet) towers imposingly, and forms the dominating feature of the district.

The botany of this area is not too well known. A. G. More stayed at Foxford, on the Moy nine miles above Ballina, for several months in the summer of 1864, and what we know of the botany of Lough Conn is due to him. Dr. Dickie visited Nephin, and in the Introduction to "*Flora of Ulster*" (1864) gives a list of its plants in descending order. Mr. Hart, in his exploration of the Mayo and Galway mountains, also ascended the mountain, and has published a good account of its scanty flora.¹ This appears to complete the enumeration of the explorers of the Lough Conn region.

¹ Report on the Flora of the Mountains of Mayo and Galway, *Proc. R.I.A.*, 2 (Science) iii., pp. 702-4. 1883.

I arrived in Ballina late on the afternoon of July 26th, for, in spite of "acceleration," the journey from Dublin still occupies seven hours. The daylight remaining was devoted to listing plants in the neighbourhood, on the Mayo side of the river. The first plant my eye fell on was that irrepressible alien, *Matricaria discoides*, which is abundant about the town. The Moy yielded little. In marshy ground were *Epipactis palustris* in full flower, *Juncus obtusiflorus*, *Pinguicula lusitanica*, *Sparganium minimum*. Coming home along the railway *Linaria viscida* appeared with *Matricaria Chamomilla* and *Festuca rigida*, and what was more interesting, a good colony of the rare *Poa compressa*. I watched for this grass on old walls, and other places less open to suspicion, but did not see it again, and to this station a † or ‡ must be appended. This last, with *Linaria viscida* and *Petasites fragrans*, constitute additions to the flora of District VIII. of "Cybele Hibernica."

Next morning I took train to Killala, situated on the sea near the mouth of the Moy, and first explored an extensive stretch of sand-dunes that lie three miles north of the village. Like all the western dunes, the flora was amazingly scanty. On the shore, not even *Salsola* or *Cakile* brightened the bare sand; and the only arenicole plants on the dunes were *Psamma*, *Viola Curtisiæ*, and *Cerastium tetrandrum*. A relieving feature was furnished by the great abundance of *Gentiana Amarella* in full bloom, interspersed with the white stars of *Sagina nodosa*. Refreshed by a swim, I returned along the shore, adding considerably to the Mayo salt-marsh list. Killala consists of a round tower and many public-houses. In one of these I had lunch, in company with an aged lady fiddler, and to her unmitigated blessings,¹ when I offered to pay her modest reckoning, the best find of the day, which was made immediately after, must naturally be attributed—namely, the alpine *Draba incana*, growing on sand-dunes half a mile east of Killala, unknown hitherto in County Mayo. Killala yielded

¹ This good lady's speech is really worthy of preservation:—"Faith, an' I didn't know, acushla, what the divil I was to say to Mrs. Casey, for sorra a pinny I had an me barrin' three-ha'pence, an' the half of that owed already; but the Lord has sint a holy man from the dear knows where with a tin drum on his broad back [the reference is to my vasculum], who has relieved me of all my dishtress; and may all the blissins," &c., &c., &c.

also three additions to the flora of District VIII.—*Sisymbrium Alliaria*, *Chenopodium Bonus-Henricus*, and *Carex riparia*. Thence I followed the shore eastward, with the sand-dunes of Bartragh Island cutting off the open sea, to the beautiful ruins of Moyne Abbey, where *Inula Helcnium* and *Petroselinum sativum* still tell of the Franciscan kitchen-garden. Then up the Moy estuary, past Rosserk Abbey, and inland to Rathroeen Lough, where a good haul of bog and water plants was obtained, including *Potamogeton obtusifolius*, new to VIII., *Carex limosa*, &c. A few miles by road brought me to Ballina.

Next morning I started westward, and first halted at Deel Castle. The woods there added some plants to my list, including *Epipactis latifolia*, new to VIII., and *Viola odorata*, also new to VIII., but to be marked here with a †. I struck the Lough Conn shore at the mouth of the Deel River. The characteristic flora of Lough Conn turned up at once—*Sanguisorba officinalis*, first found here by Mr. More, one of the most local of Irish plants, its other stations being all in the North-east (District XII.) I may say at once that I found it right round the lake, but never more than a hundred yards from the water's edge; it is more abundant on the eastern than on the western side, and becomes rare on the southern shores, where the limestone is replaced by gneiss and granite. With the *Poterium* were *Thalictrum collinum* and *Galium boreale*, which also occurred right round the lake; *Plantago maritima*, abundant over this whole district; *Lithospermum officinale* in quantity; *Rubus saxatilis*, &c. The shores of Lough Conn on this side are exceedingly stony, and the characteristic scene on the lake-shore consists of a slope like a badly macadamized road gay with the flowers of the *Poterium*, *Thalictrum*, and *Plantago* aforesaid set among sheets of Wild Thyme—a combination to be seen nowhere else in Ireland. My boots were beginning to complain of the knife-like edges of the stones when I reached a patch of bog on the shore opposite Annagh Island, and when crossing it what was my delight to see the erect bushes of *Erica mediterranea* growing among the commoner heaths. There was not much of it here—only a half dozen plants were counted—but six were as good as six hundred. The known range of this, one of the most interesting of our Cantabrian plants, was well defined,

stretching along the coast of the wild metamorphic country from Roundstone to Broad Haven; here it was far to the eastward of its most easterly station, and on the low-lying inland limestone.

At Cloghans I left the lake-shore for a while, and visited Derrymannin Lake, which proved barren, and I returned to Lough Conn at its south-eastern end. Here the limestone ceases, and a bolder shore-line is formed by gneissose rocks. Heathery bluffs project over the lake, alternating with lovely bays of clean reddish sand. A bathe was the natural result of the advent of deep water, and then the change of the flora was noted which followed the change of soil. A new group of plants appeared, among which were *Radiola*, *Filago germanica*, *Hypericum clodes*, *Gnaphalium sylvaticum*, and all the commoner calcifuge members of our flora. Lough Conn is separated from Lough Cullen by a wild, picturesque rocky neck of land, and over this I passed to the beautifully situated little inn at Pontoon. An evening stroll along the Lough Cullen shores revealed nothing new except *Scutellaria minor* and a couple of Charas.

On four out of the five days which I spent in Mayo, the weather showed a commendable habit of raining smartly for an hour in the morning, to freshen things up, and then clearing to a glorious day. The morning I left Pontoon was no exception. A steep pass between wooded hills led to the Lough Conn shore in its south-western corner, where *Poterium*, *Thalictrum*, and the rest were waiting to welcome me. A rocky bluff yielded *Taxus* and *Populus tremula*, evidently native, and a couple of Hawkweeds not yet named. Further on, another Hawkweed of the accipitrine group was gathered, and *Lobelia Dortmanna* in the lake; also *Scleranthus* and other additions to the calcifuge group. Striking inland at Wood Park, Levally Lough was visited, and a great bog whereon *Rhynchospora fusca* was the most interesting plant. Then I turned towards where Nephin towered into the clouds on the north-west. One of the few explorers of Nephin invites his readers to "start from the summit and descend downwards in various directions." I found it possible only to ascend upwards in one—the one I chose being the course of a streamlet on the south-east side. The ascent is steep and the mountain very bare. For a long time *Saxifraga umbrosa*

is the only interesting plant, but towards the summit large areas of stony slope are covered with this and *Armeria maritima*. The clouds cleared away as the top was reached, and I enjoyed a glorious view, extending from Slieve League and Ben Bulbin to Longford, Loughrea, and Achill. *Carex rigida* and *Salix herbacea* were on the summit. On the north side of the mountain is a gigantic cirque, into which I descended, seeing *Saxifraga stellaris*, and at least a thousand feet below the summit *Vaccinium Vitis-idea*, found by Dickie but not by Hart. From the base of Nephin I returned to the Lough Conn shore at Castlehill. North of this, a considerable peninsula projects into the lake. Its neck is boggy, and the bog extends northward towards Inishcoe House. I was stumbling along here through heathery tussocks, when to my delight I came on *Erica mediterranea* again. This time it was in abundance, its erect-growing round bushes rising on all sides among the low scrub of *Myrica* and *Schænus* that fringed the lake, and though of course out of blossom (save a few tiny sprays) it was a sight to gladden the heart of a botanist. The heat and flies were both forgotten, and in great good humour I crossed the woods of Inishcoe and rejoined the lake shore. Here *Agrimonia odorata* put in an appearance, growing in quantity under the sheltering fringe of bushes that marked storm-level, and it continued abundant right up to Gortnaraby (now figuring as Gortnor Abbey!) where I swam for some pond-weeds. *Salix alba*, unrecorded for VIII., looked as native here as it usually does—which is not saying much. It was late when I reached Crossmolina, and a pleasant evening drive brought me back to Ballina.

The anticline which runs across northern Sligo and forms the bleak bog-covered range of the Ox Mountains continues into Mayo as a dark forbidding ridge of 1,000 feet or more in height, which terminates at Foxford on the Moy. My previous work in East Mayo having been mainly on the limestone, this ground was chosen for the next day's work. An early train was taken to Foxford, where *Matricaria discoidea* turned up as usual. Crossing the Moy, I passed from West to East Mayo, and from District VIII. to IX. *Papaver somniferum*, apparently naturalized about here, is unrecorded for IX. Crossing a group of rocky hills, Callow Lough was visited, and I turned northward along the edge of the high ground.

There are great mounds of gravel here, which contain enough limestone to harbour *Carlina*. From Ballina and Nephin I had noticed a rather bold cliff in among the hills, and a circuitous mountain road brought me to where it looks down on the sequestered valley and peaty lakes of Glendaduff. Unaware at the time that Mr. More had recorded *Saxifraga umbrosa* from "hills north-east of Foxford"—probably this identical station, its only habitat in District IX.—I had set my heart on finding the London Pride here, and sure enough here it was, growing abundantly from top to bottom of the cliff and talus. This spot is within a couple of miles of the Sligo boundary, and as the hills increase in height to the eastward, it appears not unreasonable to hope that this gem of the Irish flora may yet be added to the list of Sligo plants, despite Mr. Colgan's negative results (*J.N.*, v., 301). Be it noted that Mr. Colgan's explorations did not extend to the Mayo end of the Ox Mountains.

Thence northward to Ballymore Lake, where *Lobelia Dortmanna* and *Nymphaea alba* vied with each other in decorating the boggy margins. This was good ground, and I added materially to the East Mayo list. *Anthemis nobilis* and *Viola tricolor* were new to the flora of District IX. Lough Doo and Carrowkeribly Lake, which adjoin, proved comparatively a failure, and as the sun went down I headed northward for Ballina through the endless bogs of the Moy valley, the featureless road being enlivened by the crowd of men, women, and donkeys—ridden, driven, or panniered—which were returning from the fair.

On my last day I had intended working across the flat bog-covered limestone country from Ballyhaunis to Swineford, but heavy rain set in when I was but a few miles from the former place, and after sheltering behind a wall on a bleak grassy ridge (houses and trees were almost non-existent) for two hours, I had to beat a retreat to Ballyhaunis, and thence to Claremorris. The rain over, a profitable afternoon was spent in wooded country south of the latter place, and a number of woodland plants added to the flora, of which the best was *Milium effusum*. Claremorris was reached as darkness fell, and next morning I said *au revoir* to Mayo.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Corn-crake from Mr. G. V. Lovell, a Sparrow-hawk from Mr. A. E. Leeper, a pair of Kingfishers from Mr. R. Edwards, a Puffin from Mr. R. Kennedy, a Cockatoo from Miss O'Donnel, and a Sanderling from Dr. C. J. Patten. A Bactrian Camel, a White-tailed Gnu, a Python, and four Monkeys have been bought.

17,042 persons visited the Gardens in July.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 4. GLENAVY AND LOUGH NEAGH.—A large party left Belfast, and were joined by members from Lisburn and Antrim. Deviating from the county road, the party entered Glenconway, and for some distance traced the banks of Glenavy River. Here the photographers made some records, and the entomologist some captures, while the botanists were by no means idle. The eastern margin of Lough Neagh, with its sandy borders, possesses a varied and very interesting land flora. The lake-shore yielded the Yellow Loosestrife, *Lysimachia vulgaris*, one of the rarer pond-weeds (*Potamogeton heterophyllus*), and the Cow-wheat, *Mcclamyrum pratense*. An otherwise unattractive roadside wall furnished the best plant of the day. This was *Poa compressa*, a species which until recently was only recorded for two stations in the North of Ireland, as it is not a conspicuous plant; it has probably been overlooked, and may possibly be found elsewhere. The well-known fossil wood or "petrified wood" of Lough Neagh was collected along the shore near Sandy Bay. Good cabinet specimens were selected, which illustrated stages in the process of silicification, one part being soft lignite and part solid stone. Solid blocks of ferruginous clay or ironstone were also obtained, which, when split open, were found to contain beautiful impressions of leaves. Similar plant-remains occur in the iron-ore beds of Ballypalady, Glenarm, and elsewhere in Co. Antrim.

BELFAST AND DUBLIN NATURALISTS' FIELD CLUBS.

JULY 11-13. JOINT EXCURSION TO NAVAN AND THE BOYNE VALLEY.—The parties from Belfast and Dublin, numbering altogether 36, met at Drogheda on the morning of the 11th, and took train to Beauparc, a few proceeding to Navan direct. By kind permission of Mr. Lambert, the members passed through the demesne of Beauparc, and across the Boyne, where the fine foldings of the Carboniferous limestone were photographed, and some good plants collected, including *Poa palustris*,

which has here its only Irish station. Thence the tow-path was followed for six miles to Navan. The botany of the river banks was interesting. The best find was *Acorus Calamus*, and among the other plants collected were *Thalictrum flavum*, *Ranunculus Lingua*, *Stellaria palustris*, *Rosa rubiginosa* (common), *Calamintha officinalis*, *Hydrocharis Morsus-ranæ*, *Carex acuta*. Mr. Welch photographed a magnificent clump of *Alisma Plantago*. The weather on the whole was too dry for collecting mollusca, but a shower brought up, on the Iris by the riverside, very large *Succinea putris*, some of which had very deep, rich colouring. Later in the evening a new Irish station was found for the very rare and local *Helix hortensis*, which swarmed all over the gravestones in Ardbraccan churchyard. *Planorbis fontanus* of a rather large size was found in small pools close to the Boyne, while *Valvata cristata*, so local in the north-east, was common everywhere. In the evening the local objects of interest were visited, including Mr. Fitzherbert's salmon hatchery and Donaghmore round tower.

Next morning train was taken to Oldcastle, whence the party drove eastward and thoroughly explored Slieve-na-calliagh and its interesting prehistoric burial chambers. *Cystopteris fragilis* was gathered on one of the earns, and a number of calcifuge plants noted. The drive was resumed to Kells, where dinner was waiting. The evening was devoted to inspecting the many antiquities of this interesting town, and a late moonlight drive brought the party back to Navan. In Kells churchyard *Helix hortensis* was again plentiful, more so than *H. nemoralis*, which swarmed in the other damp localities visited.

On the third day cars were taken to Trim. The enormous bushes of *Rosa arvensis* in full bloom in the roadside hedges excited much admiration. Rain commenced to fall at Trim, but did not prevent full justice being done to the fine old castle, the "yellow steeple" (near which the snails *Helix virgata* and *H. acuta* abounded) and other famous remains of this historic town. The Rev. Canon Norman, who was with the party, stated that he never knew *Helix acuta* to occur inland in England. In Ireland it rarely does so, and only on the central limestone plain. In the evening the Belfast members left for the north, followed a couple of hours later by the Dublin contingent.

Myriads of the "Meadow Brown" butterfly (*Epinephile janira*) were observed rising from the bramble-bushes in the overgrown hedges between Slane and Newgrange in an extension trip made by some of the members. Fifty or more would rise as the car passed from an area only 5 to 10 feet square, and this abundance of the species was noticed for miles along the narrow roads near Newgrange and Dublin.

NOTES

BOTANY.

*PHANEROGAMS.****Matricaria discolor* in Ireland.**

In the course of an excursion to New Grange and Monasterboice, made on the 28th June last, I came across this aggressive alien in several stations both in Louth and Meath, in neither of which counties does it appear to have been observed previously. It was noticed for the first time that day about a mile beyond Drogheda by the side of the road leading to Oldbridge, and a couple of miles farther on, at Oldbridge itself, appeared again in a deserted quarry close by the Boyne monument. Both of these stations are in county Louth. Passing into county Meath just beyond Oldbridge, the plant again turned up on the roadside near Dowth and re-appeared in considerable quantity between Dowth and New Grange. Soon after leaving New Grange for Mellifont and Monasterboice, the plant made its fifth and last appearance for the day, this time at Rossan, where it occurred in great profusion, covering the roadsides with a characteristic carpet of greenish yellow. So far the plant has been observed in the following nine Irish counties:—Dublin, Louth, Meath, Westmeath, King's Co., Roscommon, Galway, Mayo, and Sligo, its area of distribution forming a broad band stretching right across Central Ireland. Records from Northern and Southern Ireland are still wanting. Appearances all point to its independent introduction into numerous localities, from none of which the plant has yet had time to spread very widely. Further observation will no doubt show that the isolated centres of distribution in which it has already made a lodgment are much more numerous than would appear from existing records.

Dublin.

NATHANIEL COLGAN.

To Mr. Colgan's Meath station I can add three others—Navan, Drumree, and Hill of Down. To his list of counties three others may be added—Monaghan, where it was recently observed by Mr. A. Somerville, and Longford and Cavan, where I noted it this season. It will be seen that the invasion of Ulster by this enterprising alien is now fairly begun.

R. LLOYD PRAEGER.

Rediscovery of *Poa compressa* at Londonderry.

On July 4th I gathered this grass on a wall about half a mile further north than the "Old Walls." It is growing in considerable quantity. Mr. S. A. Stewart very kindly identified it for me.

MARY J. LEEBODY.

Londonderry.

ZOOLOGY.

ANNELIDS

Irish Nephthydidae.

In his notes from the Gatty Marine Laboratory of St. Andrews, Prof. W. C. McIntosh, *Ann. and Mag. Nat. Hist.* (7), vol. v., March, 1900, reviews the British *Nephthydidae*, a family of marine worms. Of the nine British species several are known from the Irish coasts, and one, viz., *N. hystrix* is new to science. The latter was obtained at Castletown-Berehaven during one of the Royal Irish Academy dredging expeditions. Another, *N. incisa*, procured on the shores of Connemara by the late Mr. A. G. More, is not known from any English or Scottish stations, but also occurs in Scandinavia.

INSECTS.

Acherontia atropos off the Wexford Coast.

Mr. A. B. Wall, Master of the Coningsbeg Lightship, ten miles off the south coast of Co. Wexford, has just presented to the Dublin Museum through me a Death's-head Moth, caught on board the lightship on June 11th. Within the past eighteen years I have received about a dozen specimens of this moth from Irish lighthouses, but always from mainland stations.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

MAMMALS.

Bats in the North of Ireland.

Perhaps the following notes may be of interest as helping to add a little to our knowledge of the distribution of Bats in Ireland.

In 1898 I received four species of Bats from the undernoted localities:—*Plecotus auritus* (Long-eared Bat).—Belfast, Co. Antrim. Kilkeel, Co.

Down. Clough, Co. Down. Cootehill, Co. Cavan. Castlederg, Co. Tyrone. Limavady, Co. Londonderry.

Vesperugo pipistrellus (Common Bat).—Belfast, Co. Antrim. Rostrevor, Co. Down. Donaghcloney, Co. Down. Annalong, Co. Down. Strandtown, Co. Down. Holywood, Co. Down. Cootehill, Co. Cavan. Limavady, Co. Londonderry. Sligo, Co. Sligo. Granard, Co. Longford. Castlederg, Co. Tyrone.

Vesperugo Leisleri (Hairy-armed Bat).—Whitehouse, Co. Antrim. Marino, Co. Down. Belturbet, Co. Cavan. I also saw a specimen got at Belmont, Co. Down, in September, 1896.

Vespertilio mystacinus (Whiskered Bat).—See *Irish Naturalist* for June, 1900, p. 162.

ROBERT PATTERSON.

Belfast.

TWO NEW TEXT BOOKS.

Text-book of Zoology treated from a Biological Standpoint. By Dr. OTTO SCHMEIL. Translated from the German by Rudolf Rosenstock, M.A. Edited by J. T. Cunningham, M.A. Part I. Mammals. With numerous illustrations. London: A. and C. Black, 1900. Pp. viii. and 138. Price 3s. 6d.

The special feature of this useful volume is that it "treats animals always as living organisms." To quote Mr. Cunningham's preface "Zoology from this point of view attracts children almost without exception, while for them the subject has but little interest from any other point of view." Consequently the author's plan has been to take one or more typical mammals of each order and describe these in some detail, laying particular stress on the relation between their structure and their manner of life. The systematic part of the volume is unfortunately disfigured by several errors, such as the inclusion of the Chimpanzee and Orang in the same genus.

The book is marked "for the use of schools and colleges." For purely elementary work, we fancy that it will be more used by teachers than by their pupils, as there are many hints, directions, and unanswered questions which are clearly addressed to the former, while the diagnoses of the phylum, class and order are among the facts of zoology that have "but little interest" for the latter. An intelligent teacher will find the book full of invaluable hints, and we congratulate the class of boys or girls who learn zoology from actual specimens on the lines here laid down.

First Stage Botany as illustrated by Flowering Plants.

For the Elementary Stage of the Science and Art Department. By ALFRED J. EWART, D.Sc. Pp. viii. and 252. London: W. B. Clive, University Tutorial Press. 2s.

During the past few years several excellent introductory books on Modern Botany have appeared. Not the least useful of these is this, the latest, under review. The book is written by a botanist who has done work in vegetable physiology, and has also had experience in teaching.

The first hundred pages are devoted to the structure and functions of the stem, root, and leaves of a plant, directions being given for practical work, and series of questions here, as in other parts of the book, set. Accounts of flower, fruit, seed, and classification follow, the characters of many natural orders being given and illustrated. The appendix on physiology is very good as far as it goes—probably as far as one could expect in an elementary book. The book is illustrated by 236 figures, some of which are severely diagrammatic, but as the book is avowedly prepared to meet the requirements of a certain examination this feature in the illustrations is to be expected as clearness is a distinct advantage. If the subject of elementary botany could be generally taught in Irish schools on the lines laid down in Dr. Ewart's book there would be a marked advance, with benefit to student and country.

THE HABITS OF THE HAIRY-ARMED BAT,
VESPERUGO LEISLERI, KUHLE.

BY C. B. MOFFAT.

IN the *Irish Naturalist* for June of this year (p. 162) I stated that the bat which forms the subject of the present paper frequented a certain pasture-field at Ballyhyland, and that I had some hopes of finding its sleeping-place there, and of obtaining a specimen which would add it without doubt to the Wexford fauna. These objects have since been accomplished; and I have succeeded in learning some facts relating to the animal's mode of life, which call for a somewhat detailed record.

An excellent account of this animal's general characteristics was given by Dr. Alcock in his valuable paper in the *Irish Naturalist* for August, 1899 (vol. viii., p. 172). It is the largest of Irish bats, specimens weighing from 220 to 310 grains, whilst the common *Pipistrelle*, in my experience, weighs from 70 to 90, and the Long-eared Bat from 100 to 130 grains. It flies early¹, high in the air; its voice is powerful and shrill; and its habit of constantly screeching in certain spots is apt to betray its presence. Its exact periods of flight and repose have hitherto not been investigated, and on this point Dr. Alcock expresses himself with scientific caution:—"As far as I can ascertain—the point is difficult to determine—the Hairy-armed Bat flies for about an hour, and then retires, not to reappear till the next evening."

For a mammal to enjoy so short a period of activity as this would be very singular, and during a recent visit to Fassaroe—a headquarters of *Vesperugo Leisleri*—I obtained evidence that the flight is not so strictly limited, for on July 22nd I saw several bats of this species flying in the *early morning*:—the first and last being noted respectively at 2.56 and 3.36 a.m., or 65 and 25 minutes before sunrise. That they were Hairy-armed Bats I was certain; but specimens could not then be procured.

¹ On August 8th Mr. James Kelly, herd at Ballyhyland, pointed one out to me which he had observed on the wing at 7.30 p.m., 11 minutes before sunset.

However, the discovery that *Vesperugo Leisleri* is a morning flier was a useful step towards tracing some of these animals to their sleeping place at Ballyhyland, the morning light being infinitely preferable to that of evening for such a purpose. On the morning of August 10th I accordingly watched from 2.45 a.m. in the pasture-field already referred to, taking my stand near an old and hollow ash-tree which I had reason to suspect the bats might inhabit. At 3.35 a.m. their screams were audible in the open, where several were soon afterwards seen, hawking and sporting above the level of the tree-tops. At 4.2 one of them suddenly dipped from its elevation, and when near the ground darted towards the trunk of the old ash, where it entered a hole about seven feet from the ground. At 4.5 another dipped, and shot into the same hole. At 4.11 a third followed suit; at 4.12 a fourth entered another hole, some two feet higher up in the same tree. This was the last bat seen that morning. The four individuals noted had homed respectively 33, 30, 24, and 23 minutes before sunrise.¹

The hole into which three of the four bats had vanished was evidently the entrance to a cavity of some extent, but it was too narrow to admit of any examination of the interior. In the evening I saw the three come out again, one at 7.53 and two at 8 p.m., or 16 and 23 minutes after sunset. On the following evening five were seen, all issuing from the same hole, between 7.47 and 7.57—their times of emergence being respectively 12, 16, 17, 19, and 22 minutes after sunset. On the 12th I again saw five come out: the first *one* minute, the others respectively 8, 11, 13, and 16 minutes after sunset. When quitting their abode, though high fliers at other times, these bats skim very low over the grass.

The question of the animal's return to its sleeping-den during the night was less easily settled. On two evenings I watched the hole without any success, though the moon was full and bright, and I hid in the shadow of the ash-boughs not to disconcert the homing bats. The fact, however, that this large and noisy species suddenly ceases to be either visible or audible about an hour and twenty minutes after sunset weighed strongly against the idea of its continuing on the wing all

¹ In explanation of these figures, I should state that at Ballyhyland (lat. 52° 31' N., long. 6° 43' W.) sunrise on August 10th is 4 minutes later than at Dublin, and sunset 1 minute earlier.

night. Other considerations also pointed to the probability of its retiring early, as the Noctule is known to do (though that species has not yet been ascertained to come out again in the morning). Dr. Alcock had drawn my attention to the fact that Hairy-armed Bats shot by him an hour after sunset had their stomachs so crammed with food that it seemed a physical impossibility they could feed much longer.

I therefore argued that since I could not detect the bats going *in* in the evening, I must endeavour to catch them as they came *out* in the morning. This would at least prove the fact, though not the time, of their retirement after dusk. So, on the night of August 12th, I fixed a net at midnight over the mouth of the hole. In the early morning hours of the 13th I watched by this net (some brilliant Perseid meteors relieving the monotony of the vigil), and at 3.15 a.m. heard a bat gently flop into it. I found that I had secured a fine female *Vesperugo Leisleri*, caught emerging for her morning flight, one hour and twenty-six minutes before sunrise.

Having made sure of my specimen, I quickly removed the net so as not to disturb the remaining inmates of the hole in their egress. I failed to see any bats emerge—the light being too dim—but at 4.20 had the satisfaction of seeing one re-enter. As this individual cannot have left the hole while the net was over it, the duration of its flight had not exceeded sixty-five minutes.

In the evening of the same day I saw four bats (the survivors of the colony of five) emerge for their evening flight in quick succession between 7.38 and 7.42, 6 and 10 minutes after sunset; and at 8.53 by a fortunate chance, the moon's rays falling full on the line of flight at the moment, I succeeded in seeing one go in. This was one hour twenty-one minutes after sunset. As the interval between earliest and latest emergence had been so short, the duration of this example's flight can be told with some exactness. It cannot have been on the wing for a *longer* period than 75 or a *shorter* one than 71 minutes.

We may thus claim to have a set of data, limited in number, but precise as far as they go, determining the flight-time of this local and somewhat imperfectly-studied species. It has an evening flight and a morning flight, the two being of about

equal duration. The evening flight is usually commenced a little earlier than 15 minutes after sunset, the average of seventeen actual emergences noted being $13\frac{1}{2}$ minutes, the earliest 1 minute, the latest 23 minutes, and the mean between the extremes 12 minutes after sunset. The bat returns at night to the same hole as serves it for sleeping apartment by day; the precise time of its return, in the only instance noted, having been 81 minutes after sunset. Its moment of leaving the hole in the morning has also been noted only once, in the case of the specimen caught on August 13th; but it should be remembered that this individual must have been the *first* to emerge on the date in question, and therefore the usual time of emergence is probably a little later than 86 minutes before sunrise. The time of going home in the morning, on an average of five observations, is 26 minutes before sunrise, the earliest and latest instances having been 33 and 21 minutes before the sun. It has been shown that the duration of one individual's (evening) flight was at least 71 minutes, whilst that of another's (morning flight) was not more than 65 minutes. The usual duration is, in all probability, not far from the mean between these two figures. The animal, therefore, in summer, spends one-tenth of its time on the wing, and the remaining nine-tenths in its sleeping-hole. In the shortness of its flight-time it is probably unique among Irish bats.

Whether the same retreat is used in winter as during summer I cannot say.¹ The field is frequented to a certain extent from May to September; but until midsummer, when the cattle are pastured there, the bats fly in it for only a few minutes each evening, just before retiring for the night. This

¹ I can now (September 15th) answer this question with a qualified negative, as the bats have lately deserted the hole, and bestowed themselves in separate crevices in the higher part of the tree. It is noteworthy that they migrated singly, on different dates. On Sept. 10th three (instead of four) emerged from the common den; on the 11th, two; on the 13th, none. This shows that they changed their abode voluntarily; if they had been disturbed or alarmed they would all have left at once. They still fly every evening from their new quarters. No two inhabit the same hole. This apparent scattering for the winter—though it might be thought a useful sanitary precaution before becoming torpid and helpless—is the exact opposite to what has been reported of several other species, including *V. noctula*.

shows that they range some distance in quest of food. During the late summer months the half-hour before retirement is spent in careering about the field. Their fancy for cow-pastures is a point to which I have previously drawn attention (p. 162), and is doubtless explained by the presence of certain species of insects in such localities.

My captive, whom I fed exclusively on insects for a week, refused various house-flies, as well as the blue-bottle (*Calliphora erythrocephala*), common crane-fly (*Tipula oleracea*), and horse-fly (*Hæmatopota pluvialis*), but enjoyed the common *Volucella*. She partook with relish of the honey-bee (*Apis mellifica*), and of five species of wasp (*Vespa vulgaris*, *V. germanica*, *V. rufa*, *V. sylvestris*, and *V. norvegica*). A humble-bee (*Bombus terrestris*) and red-tailed bee (*B. lapidarius*) were eaten, but subsequent specimens of *B. terrestris* were declined. The only coleoptera offered, a few small scatophagous beetles, were promptly devoured. Above all, she evinced an extraordinary partiality for the common cockroach (*Blatta orientalis*). This was a highly convenient taste, since it could be gratified at the most unearthly hours, and at such hours did her ladyship, who lived in a box in my bed-room, frequently wake me with orders to fetch her something immediately from the kitchen! She has eaten nearly a third of her weight in cockroaches in one night.

Next to the cockroach, I think her favourite food (among the insects offered) was the honey-bee, when *dead*; but she showed the greatest horror when I offered her a *living* bee, though I held it securely in my hand, and had previously extracted its sting. This was no mere accident, for the experiment was repeated on successive days. In two instances she managed, apparently by a sudden "flick" of her tongue, to throw the bee to a distance. At first I was surprised that this nocturnal mammal should so well comprehend the offensive capabilities of a day-flying insect; but when we remember the common propensity of both *Vesperugo Leisleri* and *Apis mellifica* to take up their abode in hollow trees, it is at once seen to be quite natural that they should know something of each other's powers. The identical ash-tree in which the Hairy-armed Bats now under notice reside has often been occupied by bee-swarms.

The pedestrian habits of this species in captivity (so unlike those of the *Pipistrelle*) have been noticed by Dr. Alcock (*I. Nat.*, vol. viii., p. 173), and by Mr. Barrett-Hamilton (*I. Nat.*, vol. ix., p. 134). Those of my specimen were similar; I only once saw it take flight, from the edge of my bed, and I suspect that *Vesperugo Leisleri* has some difficulty in taking wing from a level surface. Once, too, I was wakened by the whirr of its wings cutting circles round the room.

This bat is undoubtedly an early hibernator, retiring abruptly about the 26th of September, the date mentioned in Dr. Alcock's paper. The exact period is probably fixed by the falling temperature. At Ballyhyland, in 1899, my observations in the accustomed place of flight were—September 25th, usual number flying; 26th, only one; 27th, none. The maximum temperatures for the above three dates were respectively $57\frac{1}{2}^{\circ}$, 53° , and 49° Fahr.

But though hibernation thus commences early, it is subject, like that of other species, to interruption on the return of warm weather. Near Fassaroe, during a warm spell, I have seen Leisler's Bat flying numerously on October 17th, and a single specimen on October 20th. The late A. G. More identified one captured indoors at Cromlyn as late as November 16th, 1894 (*Irish Naturalist*, 1897, p. 135), and Mr. Nichols has informed me that this specimen is in the Museum. The lowest temperature at which I have noted Hairy-armed Bats in the open is 46° (on October 8th, 1899), but on that evening they were out in some numbers. I therefore think that this species is more influenced by the heat of the *day* than by that of the actual time of flight; for I have never seen it when the day's *maximum* was below $52\frac{1}{2}^{\circ}$, and never *numerously* with a lower maximum than 56° Fahr.

A slight odour, not unlike the "scent" of the fox, marks the entrance to the den of the Hairy-armed Bat.

Ballyhyland, Co. Wexford.

OBITUARY.

THOMAS WORKMAN, J.P.

The sudden death in St. Paul, Minnesota, U.S.A., on 11th May, of Mr. Thomas Workman, caused deep regret not only in Belfast and its Natural History and Philosophical Society (of which he was at the time President), but throughout Ireland. Although largely occupied in business, religious, and philanthropic work, Mr. Workman devoted much time to natural history pursuits, and undertook several journeys to tropical countries largely with the object of studying exotic animals in their natural surroundings. In 1881 he visited Brazil; in 1883 he spent eight months in the east—India, Burmah, Singapore, China, and the Phillipines. In 1888 he was in Singapore and Ceylon, in 1890 in Singapore and Java, and in 1892 in Ceylon, Singapore, and India again. As already mentioned, his death—at the age of 56—took place during an extensive journey in North America. Notes of many of these journeys were communicated to the Belfast Natural History and Philosophical Society.

Mr. Workman was well-known to zoologists as an ardent student of the spiders. On the suggestion of the Rev. O. P. Cambridge he made large collections of these animals in Ulster. He published a valuable Irish list in 1880 (*Entomologist*, vol. xiii.), and gave much generous help to one of the editors of this journal in recent years. Mr. Workman leaves an unfinished book on Malaysian Spiders, with plates and valuable synonymic and bionomic notes. Only one complete volume has been published, but it is hoped that the deceased naturalist's MSS. will allow at least some more of his valuable work to be given to his fellow-students of a most fascinating group of animals.

ARTHUR WYNNE FOOT, M.D.

A link with the former generation of Irish naturalists is severed by the death of Dr. A. W. Foot, which took place on September 1st, after years of delicate health. Born at Dublin in 1838, he graduated in Arts and Medicine at Trinity College in 1862, and subsequently rose to great eminence in his profession, occupying in later years the posts of Vice-President of the College of Physicians, and Professor of Medicine in the College of Surgeons. He will be remembered by naturalists for his researches in Irish entomology. Almost the only follower in this country of the great Haliday's work on the Diptera, Dr. Foot published two valuable papers in the sixth volume of the *Proceedings* of the Dublin Nat. Hist. Society (1869).

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of Pochards from Sir Douglas Brooke, Sparrowhawks from Mrs. Harte and Colonel Mansergh, monkeys from Mr. A. E. Kenny and Mrs. Blakeney, a Kestrel from Miss Lovell, an Otter from Mr. M. Timulty, two Giant Tortoises from the Hon. Walter Rothschild, a cockatoo from Mrs. Booth, Peregrine Falcons from Mr. Brooke and Mr. H. M. Winder, and a pair of Green Linnetts from Mr. Edwards.

18,064 persons visited the Gardens during August.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 23.—The third field meeting of the summer session was held in Tollymore Park, by kind permission of Lord Roden. The park is laid out on the sloping sides of a valley, through which the Shimna River traces a winding course. The bed of the river is formed of some of the oldest stratified rocks in Co. Down, and illustrates in a remarkable manner the eroding effect of river action, and the fantastic forms into which running water can sculpture the very hardest rocks. About eighteen birds were recorded, and a large number of beetles were collected for further examination. As this is a noted botanical district, the botanists were very active, and verified the names of many species. The Vice-President (Mr. W. H. Phillips) offered a prize for the best lists of ferns observed. Mr. Porter, the winner of the first prize, verified seventeen species of ferns, and Mr. Orr took the second prize with fifteen species.

A formal meeting of the Club was held in the Roden Arms, in the village of Bryansford, just outside the park gate. Mr. Robert Welch was formally congratulated upon his being appointed photographer to the Queen. His accepted works included many that were taken in connection with the Belfast Naturalists' Field Club. After the election of members, the party adjourned for tea, and returned to Newcastle in time for the last train to Belfast.

AUGUST 11.—The fifth meeting of the session was held at Glenavy and the shore of Lough Neagh. A large party left Belfast, and were joined by members from Lisburn, Antrim, &c. The walk from Glenavy railway station to Lough Neagh—a distance of about two miles—was undertaken under the most favourable conditions, and has highly appreciated by the party. Deviating from the country road, the party entered Glenconway, and for some distance traced the banks of Glenavy River. The latter was very much swollen by the recent rains.

The eastern margin of Lough Neagh, with its sandy borders, possesses a varied and very interesting land flora. The aquatic and sub-aquatic plants of its waters and neighbouring drains add considerable interest, and constitute a region most attractive to the botanist. The river glen yields a good many of the sylvan species. Here the melic grass (*Melica uniflora*) was found in profusion and very luxuriant. The Yellow Loosestrife (*Lysimachia*), one of the many pretty lacustrine plants, was met with

on the lake shore; more like a garden species, it was conspicuous by reason of its brilliant heads of yellow flowers. In the lough and adjacent pools one of the rarer pondweeds was found (*Potamogeton heterophyllus*); it was very abundant, but out of flower. The unusual high water of the lake prevented the collecting of Charas. The Cow-wheat (*Melampyrum pratense*) was found on the roadside going to the lake. An otherwise unattractive roadside wall furnished the best plant of the day. This was *Poa compressa*, which until recently was only recorded from two stations in the North of Ireland. As it is not a conspicuous plant, it has probably been overlooked, and may possibly be found elsewhere.

The well-known fossil wood, or petrified wood, of Lough Neagh was collected along the shore near Sandy Bay.

NOTES.

BOTANY.

MUSCINEÆ.

Irish Mosses.

Messrs. H. W. LETT and C. H. WADDELL (in *Journal of Botany* for September), write:—While on a botanical ramble in July, 1900, we spent two days in the neighbourhood of Benevenagh, in the north of the County Derry. Amongst the sandy Magilligan Flats, at the entrance of Lough Foyle, we found *Hypnum rugosum*, Ehrh., and *Catoscopium nigratum* (Hedw.) in some quantity. The former grew in luxuriant masses amongst dwarf heather and grass on the tops of the slight elevations, and the latter—which was in nice fruit—amongst the herbage in the damp hollows of the sandy soil.

CHARACEÆ.

Chara canescens, Loisel., in Galway.

Early in August last I found a pretty form of this rare plant plentiful in one small pool in a salt-marsh east of Galway. This represents a good extension of its range, its only other known localities in the British Isles being in Kerry, Wexford, Cornwall, Dorset, and Suffolk. Messrs. H. and J. Groves have kindly confirmed the identification of my specimens.

R. A. PHILLIPS.

Cork.

PHANEROGRAMS.

Viola lactea, Smith, in Ireland.

On the occasion of the excursion of the Cork Naturalists' Field Club on Whit-Monday last (June 4) to Inchigeela, Co. Cork, I collected at that place specimens of several *Violas*, one of which, on subsequent examination, proved to be *V. lactea*, Sm. The other specimens included *V. ericetorum*, which was abundant along the lake shore, and hybrids of *V. lactea* and *V. ericetorum*, which occurred with the former on rough heathy ground. The occurrence of *V. lactea* in Ireland seems to have been doubted as, though originally recorded in Dr. Power's "Flora of Cork" (1845) as found by J. Drummond on mountains near Bantry, it is placed in the first edition of *Cybele Hibernica* under *V. canina*, while in the second edition of that work no mention is made of it. Mr. W. H. Beeby, F.L.S., who kindly examined and verified the identity of my specimens, informs me that he possesses specimens of *V. lactea* sent him May, 1899, collected by Dr. Playfair at Ballyvaughan, Co. Clare, so that there is no longer any reason to exclude this interesting plant from the Irish flora.

R. A. PHILLIPS.

Cork.

Hypochaeris glabra in Co. Derry.

In the *Journal of Botany* for September Messrs. H. W. LOTT and C. H. WADDELL publish the following note:—At p. 497 of the second edition of the *Cybele Hibernica*, *Hypochaeris glabra*, L., is placed in the appendix, where it is given among the "excluded species," and Mackay's early records of it, which were not repeated in his *Flora Hibernica*, are described for this reason as "no doubt errors," while the only other record of this plant is extinguished with a "perhaps." It is interesting therefore to be able to record the finding of a quantity of this plant in July, 1900, growing on the extensive wild sandy Magilligan Flats in the north of the County of Derry. The plants were all small, dwarfed perhaps by the sandy soil in which they were growing, and not by any means conspicuous. The station is a level space about a rood in extent, where *Thymus Serpyllum* wove a purple carpet, varied with white flowering patches, which was a sight to see. There are indications that at sometime or other the patch of ground had been cultivated, as there were slight indications of ridges through it like those left after a crop of potatoes, grown in what the Ulsterman calls "rigs," and are elsewhere designated "lazy-beds"; but it is a long time since it bore a crop, as evidenced by the plants now occupying it, and it is now far from any land under tillage. The *Hypochaeris* was also found on the rough ground beyond the limits of the thymy patch. There can be no question from the nature of the locality of its being native.

Vitality of Allium vineale.

On June 6 I collected a couple of specimens of the Crow Garlic at Poulaphouca. The flower-head was then barely showing at the end of the long arching stem. They were put into press, the paper changed a few times, and then set aside under a heap of other dried plants. On

going through the bundle at the end of August, these specimens were found to have produced fully-developed heads of bulbils of quite the average size. This surpasses the Sedums, such as *S. rupestre*, which has continued growing for six weeks with me after being put into press. The London Pride is another plant of great vitality. It does not actually grow, but the leaves will retain their moisture and remain fresh for a month or six weeks after being gathered, in spite of pressure and frequent changes of paper.

R. LLOYD PRAEGER.

Dublin.

Senecio squalidus, L., in Dublin.

In June, 1899, when passing through Inchicore in a train, I caught sight of two or three specimens of this species on a wall-top. In the same month this year, being in Dublin, I paid a visit to Inchicore to see if the plant was there only as a casual or as a colonist, and was rather surprised to find it, first, on the wall by the railway, then, more plentifully on other walls and by pathways in the vicinity, and finally, in profusion, in an enclosure in which was stored a lot of old building and railway material, and in disused garden plots and other waste places.

In several spots I also noticed what looks like a radiate form of *Senecio vulgaris*, but may be the hybrid *S. squalidus* \times *vulgaris* (= *S. hibernica*, Syme) as, in most cases, it grew in company with these two species.

In the same locality I noticed a few other interesting aliens, viz., *Lychnis alba*, *Carduus crispus*, *Crepis taraxacifolia*, and *Hordeum murinum*. The presence of *S. squalidus* in Dublin is, I think, worth recording as an instance of a South European plant which, having become well established in the south of Ireland, at Cork, Bandon, Kinsale, &c., within the past seventy years, seems now in a fair way to become a colonist in this much more northern station. I have little doubt that it has been introduced at Inchicore with old building and railway material brought from the Cork terminus of the Great Southern and Western Railway, and it will be interesting to watch the rate at which it spreads to other parts of Co. Dublin. My friend, Dr. R. W. Scully, F.L.S., informs me that he has noticed it at Inchicore for the past seven or ten years, and that it appears to be spreading.

R. A. PHILLIPS.

Cork.

Plantago media in Co. Wexford.

Towards the end of July Miss E. V. Cooper showed me some specimens of this plantain, which she had found growing plentifully in a plot of ground belonging to Killanne National School. As in all its other Irish stations, the plant was probably sown with grass-seed. According to the *Cybele Hibernica*, *Plantago media*, or Lamb's-tongue, is spreading in Ireland, but the present seems to be the first instance of its having been gathered in District IV. Its light lavender filaments make it much the prettiest of the genus.

C. B. MOFFAT.

Ballyhyland, Co. Wexford.

ZOOLOGY.

CRUSTACEA.

Haplophthalmus Mengei, Zaddach, in Ireland.

I am glad to be able to report the occurrence in Ireland of this rare woodlouse—only yet recorded from one locality in Great Britain. It was taken at Carcumroe Abbey, Co. Clare, by the Rev. Canon Norman, F.R.S., when we visited that interesting neighbourhood in July. Two examples only were found.

WM. F. DE V. KANE.

Drumreask, Monaghan.

Colias edusa in Ireland.

Travelling from Clonbrock to Dublin to-day (27th August) I saw a number of specimens of *Colias edusa*—four or five specimens near Ballinasloe, three males on the Roscommon side of the Shannon at Athlone, one male at Hill of Down, one male near Kilcock, and two specimens near Maynooth.

R. E. DILLON.

Clonbrock.

On 11th September I had the rare pleasure of seeing at Howth a beautifully fresh male of *Colias edusa*. It was sucking the flowers of *Lotus corniculatus* and, while I watched it, visited no other sort. As it flits from tuft to tuft closing its wings completely on alighting, the protective resemblance is surprising in an insect in which, looking only at cabinet specimens, one would hardly suspect it.

W. E. HART.

Howth.

Lepidoptera near Londonderry.

The following are new to me as local species; I think they have not been previously recorded for this district:—

Vanessa io.—My sister, Miss A. M. Campbell, captured a lovely specimen of the Peacock on 30th August, at Ballynatena, near Londonderry. It had evidently just emerged from the chrysalis.

Melitæa aurinia.—On 9th June my nephew, F. C. Campbell, jun., took this fritillary at Port Awe, near Buncrana, just at the spot where his father, Mr. W. Howard Campbell, took *Heliothis scutosa* in August, 1878.

Zygana loniceræ.—On 29th June my nephew took among a lot of *Z. filipendule*, a specimen of *Z. loniceræ*, at Inch Road Station on the Buncrana Line.

On 20th May my friend, Mr. Wm. Taylor, saw *Thecla rubi* at Lackagh Bridge, near Creslough, Co. Donegal, and procured a specimen. I had never seen either *M. aurinia* or *T. rubi* in this district, but I believe the late Dr. Osborne, of Milford, Co. Donegal, took both species.

D. C. CAMPBELL.

Londonderry.

"Warbles" in Horses.

It is apparently a fact not generally recognized that "warbles" similar to those found in cattle also occur in horses. Last April several warble-maggots were squeezed out of a horse at Ballyhyland, where the coachman assures me that he has extracted others in former years. In the *Zoologist* for July last (p. 340) is a résumé of an article on "Enemies of the Horse" by Mr. F. V. Theobald (contributed to the Journal by the South-eastern Agricultural College, Wye), in which some reference is made to this subject. Mr. Theobald is there quoted as saying that a fly, so far unidentified, which forms warbles or tumours under the horse's skin, like the Ox Warble, is probably *Hypoderma silenus*; its attacks are said to be uncommon in this country. Whatever be the name of the fly, I think it well to mention that it occurs in Co. Wexford, and probably elsewhere in Ireland, though I do not suppose it is anywhere in this country a source of serious mischief.

Ballyhyland, Co. Wexford.

C. B. MOFFAT.

BIRDS.

The Ruff in Ireland.

I have just had the pleasure of reading Dr. Patten's carefully prepared article on the Ruff (*supra*, p. 187). In it he treats of the occurrences of this bird in Ireland in more detail than I have had space to do in the "Birds of Ireland," a work which is now in the publisher's hands.

In drawing deductions from available records of a rare bird, allowance is to be made for several circumstances before a just estimate can be formed of its range or the season of its visits. Thus the discontinuance of shooting in spring, which was evidently practised a good deal in Thompson's time, may partly account for the more recent absence of records of the Ruff in March, April, and May, such as he cites.

It is natural that the greater number of the instances that Thompson gives should have taken place near Belfast Lough, the immediate scene of his observations, and also that many Ruffs should have been heard of on Dublin Bay, where many good observers have shot, and where taxidermists are not far off. Thompson had few correspondents in the West, especially in Connaught, and the greater number of records of the Ruff from the western part of Ireland made since his time, may be due to the spread of interest in ornithology rather than to any extension of the range of this species in Ireland.

Dr. Patten makes one remark in which I am unable to concur, namely, that sportsmen as a rule are keen observers, and that few strange birds pass them unnoticed. I would beg his attention to the following which have been found among game sent in from various parts of Ireland:—the Pink-footed Goose, Snow Goose, Ferruginous Duck, Little Bustard, American Lesser Golden Plover, Pectoral Sandpiper, Bartram's Sandpiper, Red-breasted Snipe, and Eskimo Curlew. No doubt Mr. Williams can add instances of many other occasional visitors that he has found exposed for sale as game in the Dublin markets. These remarks are made in that friendly spirit of free discussion which I would myself gladly invite.

Cappagh, Co. Waterford.

R. J. USSHER.

Irish Birds.

We welcome the publication of the great work on the Migration of Birds, on which Mr. R. M. Barrington, aided by Mrs. Barrington and Mr. C. B. Moffatt, has been engaged for several years. The book not only gives in full the reports of the committee on bird-migration from 1881 to 1897, but includes elaborate analyses of the reports from 1881 till 1897. The observations on which the reports and analyses are founded were made by the Keepers of the light-ships and light-houses around the Irish coasts, with the aid of printed schedules and instructions, and the correctness of their identifications were checked by means of the preserving of a leg and wing of the birds killed by striking the lanterns. The book is published by Edward Ponsonby, Dublin, and may be obtained from the publisher or the author, price 25s. net. Only 350 copies have been printed.

The long-promised general work on the Birds of Ireland by Messrs. R. J. Ussher and R. Warren is just issued. We observe that a reliable record of the distribution of each species of bird in Ireland has been made the primary object of the book, which contains also many original observations on life, history, and habits. This book is published by Messrs. Gurney and Jackson at 30s. We hope that both works will be duly noticed in our next issue.

MAMMALS.

The Vision of Whales and of amphibious animals generally.

In reference to the interesting suggestion of Mr. R. Lloyd Patterson, page 210, that whales probably have the power to ascertain the position of a ball of fry by "looking round them" when at the surface so as to see the birds hovering over and dipping for the fry or to hear their cries, a question arises—Can the whale see when its eyes are out of water?

Just as in diving under water, we whose eyes are adapted for use in air cannot see clearly, so conversely an animal with eyes suited only for water could not see clearly in air.

Are a whale's eyes "only" so suited? To enable the human eye to see clearly under water it is only necessary to use a convex lens of a focus correcting for the difference in the index of refraction of water as compared with that of air. When a whale rises out of the water has it any means of making a correction the converse of this by lengthening the focus of its eyes, or can it perhaps shorten the distance between the lens and retina? This question suggests one which no doubt could be more easily investigated—Can a frog see well both in air and water? I have not the honour of being a naturalist, and therefore know not if such questions have been already asked and answered, but if not they would seem to present an interesting field for research.

J. BROWN.

Belfast.

SOME RECENT LITERATURE.

Text-book of Zoology, treated from a Biological Standpoint. By Dr. OTTO SCHMEIL. Translated from the German by Rudolph Rosenstock, M.A., and edited by J. T. Cunningham, M.A. Part 2. Birds, Reptiles, Fishes. London: A. and C. Black, 1900. Pp. vi. and 306. Price 3s. 6d.

With commendable promptitude, the second part of Dr. Schmeil's work has been issued to English readers, so that the whole of the Vertebrates have now been dealt with. The same plan is followed as in Part 1 (Mammals) which we noticed last month, a somewhat full account of a typical species of Bird, Reptile, or Fish serving as an introduction to the study of its Order or family. We notice with pleasure that the author advocates the protection of birds. The descriptions of the structural details of the creatures in relation to their mode of life are excellent and stimulating, but there is regrettable weakness in the systematic treatment of the subject. The Lampreys and Lancelet are classed among the Fishes, and the latter animal is stated to occupy "the lowest stage in the Vertebrate division of the animal kingdom," while the account of "the Chameleon" would inevitably lead the student to imagine that there is but a single species of that group of reptiles. The numerous illustrations are, for the most part, accurate and attractive.

G. H. C.

White Cattle: An Inquiry into their origin and history, by R. H. WALLACE, *Trans. Nat. Hist. Soc., Glasgow*, vol. 5 (N.S.), parts 2 and 3, 1897-99.

Mr. Wallace's paper on the origin and history of white cattle is full of interest to Irish naturalists. Although he considers his paper simply as a preliminary collation of data, he devotes over a hundred pages to a careful inquiry into the subject, giving also a most useful bibliography at the end.

Mr. Wallace seems to us to give satisfactory evidence that the commonly accepted view of the so-called wild white cattle being the descendants of feral prehistoric cattle is incorrect. While his view is by no means new, having also recently been advocated by Prof. M'Kenny Hughes, of Cambridge, Prof. Boyd Dawkins, and others, he thinks the origin of white cattle can be traced to one or two sources. They come either from white cattle imported in Roman times for sacrificial purposes or from collections of white calves, which, being dropped by dark-coloured cattle, were regarded in those times as a portent of good, and therefore carefully preserved.

Throughout this interesting paper we find frequent references to Kerry cattle, which Mr. Wallace considers a very ancient breed, which has remained in the same condition as it is now for a good many centuries.

R. F. S.

Flora of Bournemouth, including the Isle of Purbeck, being an account of the flowering plants, ferns, &c., of the country within a twelve-mile radius of the centre of Bournemouth. By Edward F. LINTON, M.A., Oxon. 8vo. 10+290 pp. Map. Bournemouth: published by the author [1900]. Price 8s. 6d.

Mr. Linton has given us a pretty and pleasant book. While clearly intended for popular use, its scientific accuracy is in no way impaired thereby. The Bournemouth area embraces portions of two counties, and in the preparation of his work our author had the great advantage of the existence of a comprehensive Flora of each of the counties concerned—Townsend's "Flora of Hampshire" (1883), and Mansell-Pleydell's "Flora of Dorset" (2nd ed., 1895); but the great bulk of the localities given are original, and represent the work of the author, and such valuable assistants as Rev. W. R. Linton, Rev. W. Moyle Rogers, and many others. The distribution of each plant in the prescribed area has been worked out in great detail. The Introduction is useful and concise, with paragraphs on topography, climate, geology, botanical divisions, and comparison of the floras of the two counties, and of the six divisions into which the Bournemouth area is divided: also a key to less known localities, recommended walks, and Latin and English vocabulary—features unusual in such works, but useful in popularizing a knowledge of local botany. We are surprised to find no history of Bournemouth botany or botanists, nor any bibliography: this strikes us as an unhappy omission. Another important point not referred to is the general extent and character of the flora, and its analysis, showing its relation to the flora of England in general and the adjoining districts.

In the body of the work all plants, from natives to the merest casuals, appear in the same type. While giving a look of pleasant uniformity to the pages, the very unequal value of the entries so displayed is hardly made sufficiently clear by the word "outcast," "introduced," or "casual," in the line succeeding the heading; no attempt is made to distinguish truly indigenous species from colonists or denizens. Even plants which are probably errors, such as *Viola stagnina*, appear in the same type as the best established natives.

The working out of the distribution of the plants is excellent, and the critical genera have received an amount of attention that is very seldom possible in a local flora. The book is excellently printed and neatly bound, and should prove invaluable to the botanist at Bournemouth, whether resident, migratory, or casual.

R. I. L. P.

THE BIRDS OF IRELAND.¹

BY C. B. MOFFAT.

THE completion of Mr. Ussher's long-expected work is an event to be hailed with universal satisfaction. The ornithologists of this country now possess a manual of which it is impossible not to feel proud, embodying as it does an account of our avifauna so comprehensive and thorough as to be literally beyond praise. The work to which Mr. Ussher has devoted so many years of patient toil is worthy of him in every respect. Besides bringing our knowledge fully up to date as regards the distribution of birds in our own island, it is a valuable contribution to general British ornithology, and the more closely it is studied the better it will be prized.

In speaking of the volume as Mr. Ussher's, it is not meant to ignore the important aid given by his colleague in the authorship, Mr. Robert Warren. Mr. Warren, besides writing a number of the articles, has contributed enough from his great store of personal observations on birds to considerably enrich the book. But it is at the same time well known that the work is substantially Mr. Ussher's, and that to him we are primarily indebted for the accumulation and arrangement of the vast mass of materials which are here presented to the student with such mature judgment and such scrupulous care.

The book opens with a preface in which the authors state briefly their object and plan, paying a well-deserved tribute to the memory of their distinguished predecessor, Thompson, whose work, though long out of print, contains so much original information that it can never cease to be a standard. The preface is followed by an introduction, treating of the striking features of Irish ornithology, and noting the principal changes which have taken place in it of late years. Then comes a very carefully prepared table, showing the distribution of our breeding birds in counties. Mr. Ussher takes the

¹ **The Birds of Ireland, an Account of the Distribution, Migration, and Habits of Birds as observed in Ireland, with all additions to the Irish list;** by RICHARD J. USSHER and ROBERT WARREN. Including an Introduction and Tables showing the Distribution of Birds in the Breeding Season. With a coloured Plate, Maps, and other illustrations; pp. xxxii. + 419. £1 10s. London: Gurney & Jackson, 1900.

counties in an order of his own, which is neither Professor Babington's nor Mr. Praeger's, but is made to correspond with their arrangement into provinces; thus the Munster counties come first, followed by those of Leinster, Connaught, and Ulster. The symbols employed in this table need to be studied attentively, but we think we are safe in inferring, although Mr. Ussher does not say so definitely in his "key," that wherever an asterisk is used and is not followed by a note of interrogation, the implied statement is that the species breeds *regularly* in the county under whose name such asterisk occurs. Then come the articles on each species which compose the body of the work (pp. 1-396), the order followed being that of Mr. Howard Saunders' Illustrated Manual. In an Appendix, fifteen aliens, whose claims to inclusion in the list of Irish birds are considered insufficient, are shortly noticed; and a final supplement communicates some additional information received since going to press. There is a handsome coloured frontispiece—"Peregrine Falcon's Eggs from Ireland,"—and several photographs, showing nests of the Siskin, Peregrine, Cormorant, Woodcock, Little Tern, &c., add to the attractiveness of the book. A map of Ireland, in two sections, showing the unreclaimed land, is placed after the index.

It is obvious on the most cursory inspection that the volume before us nobly fulfils its primary object of outlining the distribution of birds in Ireland. On this subject Mr. Ussher has spared himself no pains, and the information given is as full and exact as could possibly be asked for. It was a work of years to collect the data presented in the opening table, and equal labour has been bestowed on the occurrences of irregular visitants. These are chiefly grouped according to counties, but when only about six occurrences of a species are known, they are placed in order of time, instead of in geographical arrangement. As might be expected, habits and nidification have not been lost sight of, especially as regards birds which are considered characteristic of Ireland. The articles on the Peregrine Falcon, Chough, Siskin, Crossbill, Woodcock, and Common Guillemot are, from this cause, written at much greater length than most of the others, and are of more than average interest. The Peregrine article is probably the masterpiece of the book, and the passage descriptive of the

eyrie of that bird is most graphic. Some readers may think the account of the Chough's home even better. A conspicuous feature of the book is its frequent references to Mr. Barrington's recently published Migration Reports, and in this connection it is right to point out that Mr. Ussher's inferences from the Reports are the result of his own independent analysis, and are not in any way based on Mr. Barrington's, though in the main the two sets of deductions accord very well. Where they differ, the source of disagreement will usually be found in some uncorroborated light-keeper's observations which Mr. Ussher has accepted and Mr. Barrington doubted; this being so, it is, perhaps, not a subject for regret that both points of view should be before the public.

Mr. Ussher includes in the Irish list 288 species of birds, of which 134 breed in Ireland, or have done so within the expiring century, while 37 others visit us annually, and the remaining 117 are irregular visitants. The above total does not include any of the following 15, which are relegated to the Appendix:—

American Robin.	Belted Kingfisher.	Egyptian Goose.
Reed-Warbler.	Yellow-billed Cuckoo.	Canada Goose.
Gold-vented Thrush.	Black-billed Cuckoo.	Passenger Pigeon.
Purple Martin.	American Goshawk.	Green-backed Gallinule.
Ortolan.	Black-winged Kite.	Yellow-billed Sheathbill.

It is not disputed that some of these *may* have been *bona fide* migrants, but it has been thought safer to take the sceptical side of the question in each instance.

The additions which have been made to the list since Thompson's day are numerous, and include the following, which were added since the 2nd edition of More's list was published in 1890:—

Lesser Whitethroat.	Lesser Kestrel.
Barred Warbler.	Lesser Golden Plover.
Yellow-browed Warbler.	Sociable Plover.
Rufous Warbler.	Spotted Sandpiper.
Woodchat Shrike.	Red-breasted Snipe.
Serin.	Wilson's Petrel.
Short-toed Lark.	

Apart from these, the Crested Lark, which was included by Thompson but rejected by More, has been re-admitted, on grounds which we propose to discuss before concluding this

notice. Another change is the displacement of the Dusky Shearwater (*Puffinus obscurus*, Gmel.), by the Little Dusky Shearwater (*P. assimilis*, Gould), the bird caught off Valentia having been re-examined and found to belong to the latter type.

Of more interest than such stragglers are the regular visitants and resident species, and the fluctuating character of our fauna is well illustrated by the numerous changes which Mr. Ussher shows to have taken place in the distribution and relative abundance of these since the publication of Thompson's work. The disappearance of our larger birds of prey has been rapid. The Golden and Sea Eagles are nearly gone, and the Buzzard, as a breeding species, quite so. The Hen Harrier, common in the western counties fifty years ago, has become scarce ; and scarcer still is the Marsh Harrier, though in 1853 this was the most abundant of all our larger Accipitres. With the Eagles and Harriers we are quickly losing the Raven, and the range of the Chough is much more restricted than formerly. From unascertained causes the Quail has nearly ceased to visit us, and the Roseate Tern is no longer known to breed. It would also seem that the Common Tern is losing ground, since it has now no known breeding station on the east coast of Leinster. The Wood-Lark, Mr. Ussher thinks, has in most of its haunts been exterminated by bird-catchers, and the Marsh Titmouse, which was perhaps resident in very small numbers in Thompson's day, has not been met with for many years. The Goldfinch has decreased in the vicinity of large towns, but elsewhere, unlike the Wood-Lark, holds its own.

Against these losses may be balanced a considerable number of gains. The settlement of the Stock-Dove and Tufted Duck, and the rapid increase of the Crossbill and Woodcock as breeding species, are particularly remarkable. The Starling's recent extension of its breeding-range in Ireland is also matter of notoriety, and the same may be said of the Siskin. There is strong reason to believe that the Chiffchaff was not, in Thompson's day, so widespread and common a bird as now. The Coal Titmouse, Spotted Flycatcher, Tree-Sparrow, Lesser Redpoll, Bullfinch, Rook, Jackdaw, and Red-breasted Merganser, are further instances of species which Mr. Ussher considers to be increasing. We think he might have said the

same of the House-Martin, as regards the rural districts of Ireland, though of late years it has diminished in Dublin. The Swift has extended its range to the west, where in Thompson's time it was rare. The Jay, whose former wide range had been much reduced by the destruction of woods, is spreading again. The Mistle-Thrush is probably still gaining ground, and it is doubtful whether the ubiquitous Magpie's increase has yet been checked.

There are other species of which it must remain open to doubt whether they have actually increased or not, since it is possible that they were locally overlooked in former years, owing to paucity of observers. Such, among breeding birds, are the Redstart, Blackcap, Garden-Warbler, Grasshopper-Warbler, Yellow Wagtail, Dunlin, Sandwich Tern, and Fork-tailed Petrel. There is also the curious case of the Black Redstart, once accounted a very rare straggler, while now it must be ranked as almost a regular winter visitant to our south coast. We cannot as yet say whether the greater frequency of its recent occurrences is real or apparent. But the careful data now accumulated will make it easy to gauge the increase or decrease of any of the above-named in future ; and this is a great step in advance, for which Mr. Ussher is to be thanked.

The subject of distribution, which has been so fully worked out, is infinitely more important in itself than any questions regarding the treatment of *reported* occurrences of rare stragglers ; and we are therefore not disparaging Mr. Ussher's work in expressing ourselves at variance with him on several of these minor matters. It would have been best either to have banished to the Appendix every bird not absolutely proved to have visited Ireland, or else to have admitted to the regular list all species for whom a *prima facie* case could be made out. Instead of adopting either of these courses, Mr. Ussher has drawn or accepted an arbitrary line, discarding eight American birds—most of which undoubtedly occurred in this country in a wild state—because they are open to suspicion of having obtained "assisted passages" on vessels ; while he admits the Crested Lark, Lesser Spotted Woodpecker, and Little Egret, whose alleged occurrences are not vouched for by any specimens whatever. As regards the exclusions,

Mr. Ussher may consider that he has sufficient warrant in following Mr. Howard Saunders ; but this does not vindicate the consistency of the book, for it may fairly be asked whether any species has been admitted by Mr. Saunders to the *British* list on evidence so slight as Mr. Ussher adduces for saddling the Irish list with *Alauda cristata*.

The facts as to the Crested Lark are as follows :—The *Dublin Penny Journal* of February 27th, 1836 (Vol. IV., p. 276), contained an announcement of the shooting of an example of that species near Taney, Co. Dublin, the communication being signed “W. R.,” and accompanied by a woodcut representing the bird. Thompson, on the strength of this anonymous evidence, admitted the species to the Irish list, but it was subsequently excluded by More, and indeed the case for its admission at that period was so obviously weak as to call for no further examination. In 1893, however, some fresh evidence on the subject was adduced, showing that the writer of the letter to the *Dublin Penny Journal* was none other than the now celebrated war correspondent, Sir W. H. Russell, who was a boy of fifteen when he shot the supposed Crested Lark and forwarded the notice and figure for publication. Whether this revelation of the writer’s identity makes the case for admission stronger or weaker than it was before is a question on which opinions will differ ; but the circumstances at least show that there was room for error. It is true that the bird was taken for identification to “a Mr. Colville, a member of the Royal Dublin Society,” who pronounced it a Crested Lark, and showed his young interrogator a figure of that species in an illustrated translation of Buffon. But it remains to be proved that Mr. Colville was any better at natural history than his pupil. An ornithologist would surely have made some effort to induce his young friend to have so valuable a specimen preserved, but it is evident that Mr. Colville did nothing of the kind. By Mr. Ussher’s courtesy, we are enabled to add to the known facts of the bird’s story the following details, communicated by Sir W. Russell in a letter dated December 24th, 1897 :—

DEAR SIR,—You ask me what I did with the bird which is *causa causans* of our correspondence, and my answer is that probably we ate him. I am sure I did *not* send it to the Trinity College Museum. I did not enter Trinity till 1838–9. My trophies of the chase were usually handed over to the cook, and all I can remember about *Alauda cristata* I have already imparted to you.—Yours, &c., W. H. RUSSELL.

That the famous bird was actually cooked and eaten does not, we repeat, say much for Mr. Colville as an ornithologist; and when we remember the numerous errors as to Irish birds which have been set right by re-examination of specimens long after they had been killed, it seems peculiarly unfortunate to have a new departure made in the direction of accepting a species so unsatisfactorily vouched for. Mr. Ussher has himself played an important part in securing the rectification of erroneous records of the Nightingale, Montagu's Harrier, King-Eider, and Hooded Merganser, which, *prima facie*, had much higher authority in their favour than can be claimed for the Crested Lark. The figure in the *Penny Journal* would appear from Sir W. Russell's language to have been a copy of that in the edition of Buffon to which he refers, and therefore is of little importance; and apart from that figure there is literally no authority at all for the bird, against whose inclusion in the Irish list we earnestly protest.

We will not dwell at any length on the question of the Lesser Spotted Woodpecker's claims to retention among our birds, but we believe the time has arrived when it ought to be "turned out." No specimen exists, though Glennon the bird-stuffer stated to Watters that "six or seven" had been sent him for preservation at different times. That so many should have been sent to one taxidermist, while no other evidence of the bird's occurrence in Ireland has been produced from that day to this, is simply incredible. Watters appears to have been shown two specimens in Glennon's shop, but in view of the bird-stuffer's manifestly unreliable statement about the "six or seven," we should be slow to accept his evidence as to where the two had been killed. Glennon's data were sometimes proved to be at fault, as in the instance of a certain Ruppell's Tern, which he palmed off as Irish by way of a "practical joke." Under such circumstances, the present position of *Dendrocopus minor* on our list is most unsatisfactory. It is just such a case as Appendices exist for dealing with, and to place it elsewhere is, in our humble opinion, to deprive the Appendix of all *raison d'être*.

In conclusion, we would wish to remove a slight error which might mislead visitors to the Belfast Museum. Mr. Ussher states, on Mr. Barrington's authority, that the supposed

Carrion Crow in that Museum is a Rook. This is only partly correct, for there is a true Irish-killed *Corvus corone* among the specimens at Belfast, and that bird, which has full data, was seen and its identification confirmed by Mr. Barrington in August, 1897. Besides this example, there was a Rook erroneously labelled "Carrion Crow," as Mr. Barrington noted; but as the latter bird had no data its identity is of comparatively little importance, and it does not deserve to be styled "*the* supposed Carrion Crow in the Belfast Museum." The fact that two specimens were examined, and *one* found to be wrongly labelled, will be found noted in the *Irish Naturalist* for 1898, p. 41.

The volume on which Mr Ussher has expended so much pains is very handsomely bound and illustrated, and well printed. To Irish ornithologists it is a mine of information, and no naturalist's library ought to be without it.

SPONGES, CORALS, AND JELLYFISH.

A Treatise on Zoology. Edited by PROF. E. RAY LANKESTER, LL.D., F.R.S. Part II. The Porifera and Cœlentera. By E. A. MINCHIN, M.A., G. H. FOWLER, Ph.D., and G. C. BOURNE, M.A. London: Adam and Charles Black, 1900. Pp. vi. +37+178+81+84+25. 15s. net.

Two divisions of Invertebrates, viz. :—the Porifera (sponges) and the Cœlentera (corals, jellyfishes, &c.), are dealt with in the second part of the great new English treatise on Zoology referred to in the May number of the *Irish Naturalist*.

Nearly half of the book is devoted to the sponges—a most difficult group, whose true position in the animal kingdom is to the present day a source of dispute among zoologists. While even a beginner can easily recognise a sponge among a variety of natural history specimens, the classification of the group presents the greatest difficulties. The principal divisions are still founded on the nature of the minute spicules which form the skeleton, though the old division into calcareous and non-calcareous sponges no longer holds good. Three classes of recent sponges are recognised by Prof. Minchin—the author of this portion of the work, viz. :—Calcarea, Hexactinellida, Demospongiæ. From the point of view of evolution and morphology the Calcarea (sponges with calcareous spicules) are of special interest, so much so, indeed, that Prof. Minchin deplores the powerful attraction which they offer to speculative intellects, a sad state of confusion in classification and nomenclature having resulted from overmuch theorizing.

The question whether sponges are animals or plants has long ago been settled in favour of the former view. Their protozoan nature has been upheld by many zoologists, though the opinion that they belong to the Metazoa is now generally adopted among zoologists. It is, however, when we come to a further definition of their position in the system that modern authors are so much divided. Are sponges to be regarded as an independent phylum distinct from all the rest of the animals, or should they be placed in one of the existing sub-kingdoms? Since the cœlenterate theory, according to Prof. Minchin, has become quite untenable, he rightly adopts the view so ably advocated by Sollas and Bütschli that sponges belong to a separate phylum, which probably originated from a choanoflagellate infusorian ancestor. It is to be regretted therefore that Mr. Bourne, in the sixth chapter (p. 4) again classes the Porifera among the Cœlentera.

The chapter on Enterocœla and Cœlomocœla by Prof. Ray Lankester is particularly interesting. The term cœlom was originally applied to the body cavity in vertebrate animals. The same term is now extended to the cavity or organ in other groups of animals which may be considered genetically identical with this primitive vertebrate pleuro-peritoneal cavity. As Prof. Lankester remarks, the presence of the cœlom is of the highest physiological importance. Hence all the Metazoa, except sponges, are divided into those in which the sole cavity is the enteron—the Enterocœla—and those in which the cœlom is present as an independent second cavity—the Cœlomocœla. The author then enumerates the phyla included in these two grades, their chief organs and organ-systems and discusses the various theories connected with the cœlom in a strikingly novel and attractive manner.

The chapter on the Hydromedusæ and the Scyphomedusæ, which contain the jelly-fishes and their allies, has been very ably written by Dr. Fowler. The illustrations, many of them new, are throughout the book excellent, though some of the diagrams might with advantage have been printed in different tints, as has been done by Delage and Hérourard in their great French work on zoology.

Finally, Mr. Bourne deals with the Anthozoa and the Ctenophora. The apparently aberrant group containing *Ctenoplana* and *Cœloplana* which was supposed to connect the ctenophores with the planarian worms, are now classed among the former under the order Platyctenæ. Until the development of these peculiar forms have been studied, they give us no further clue as to the suggested relationship of Platyhelminthes and Ctenophora.

The volume (Part II.) now before us quite sustains the high standard of excellence which characterizes its predecessor, and justifies in every sense the opinion already expressed in this Journal.

R. F. S.

NOTES ON THE LIMERICK FLORA.

BY R. LLOYD PRAEGER, B.E.

SEVERAL discoveries of high botanical interest have recently been made by members of the Limerick Field Club; and as I had an opportunity of studying the plants in question *in situ* during three days spent in that county in August last, I have combined these records with others which appear worthy of publication, and thrown the whole into narrative form. That these notes did not appear earlier is solely due to the time required for working out the identity, distribution, and standing of one or two of the most important plants recorded.

The flora of Co. Limerick has never been systematically investigated; a glance at "*Cybele Hibernica*" reveals a great paucity of records from that county. Recently (1897) the Field Club commenced the formation of a herbarium representing the flora of Limerick and Clare; and in 1899 Mr. A. Somerville, B.Sc., mostly kindly spent a week in working up a Limerick list for "*Irish Topographical Botany*." Nevertheless further work appeared necessary, and with this object in view I reached Limerick on the evening of August 14th. The flora of the county turned out unexpectedly rich. Over 500 species were listed in three days, and this without tapping the maritime flora of the Shannon estuary, which, as Mr. Stewart has shown,¹ is tolerably extensive. From the brief glance at the flora which I had, I augur for Co. Limerick a big total when its botany is worked out, and the addition of some further rarities as interesting as those which it will be my pleasure to record.

Just before leaving home, Miss Knowles informed me of the finding a few days before of *Rumex maritimus*, one of the rarest Irish plants, by Rev. Canon O'Brien at Lough Gur, one of the few lakes of Limerick, lying in the centre of the county. On arrival at Limerick, it was with much satisfaction that I examined the specimen at the house of my hosts, the Doctors Fogerty, and found that Mr. R. D. O'Brien's diagnosis was undoubtedly correct. We decided to spend the first day at Lough Gur, and next morning Dr. George Fogerty, Mr. R. D.

¹ Stewart: Report on the Botany of South Clare and the Shannon. *Proc. R.I.A.* (3) I., 1890.

O'Brien and I drove twelve miles to that favoured spot, long famous for the Irish Elk skeletons and prehistoric remains that it has yielded. Only two plants of *R. maritimus* had been seen by Canon O'Brien, and I feared the plant might prove to be merely sporadic, but to our great satisfaction we at once found it, growing in profusion about the boat-house under Grange Hill, and saw it later at several other points round the lake, so that its claim to native rank cannot be questioned. Previous Irish records sum up as follows :—Kilcoleman, Co. Cork—Carroll (prior to 1872, not seen since?); Lady's Island Lake, Co. Wexford, 1883—Hart; Garristown, Co. Dublin—Ogilby and Moore (last seen in 1883, now extinct?). The discovery of a new station is therefore eminently satisfactory. While gathering *R. maritimus* my eye fell on *Ceratophyllum demersum*, growing in the shallow water by the lake edge, and later it turned up choking, in its immense luxuriance, a broad drain near the old castle at the north-east end of the lake. This was a most welcome find, the plant being local and rare, and unrecorded from District VI. Nor were the rarities of Lough Gur yet exhausted, for at a number of places round the lake margin I gathered *Nasturtium sylvestre*, hitherto unknown in this part of Ireland, being confined to four rivers in the south-east, and one (Erne) in the north-west. *Chenopodium rubrum* was also a welcome find, growing among both species of *Bidens*, which fringe the lake in great profusion, and *Ranunculus circinatus* was fished out of the water. We sampled one of the rocky limestone hills which rise about the lake. *Chærophyllum temulum* was the best plant found. The site of a former lake adjoining Lough Gur on the south-east, now largely swamp and bog-hole, yielded *Lemna polyrrhiza*, stated by Harvey to be common about Limerick ("Flor. Hib.", 1836), but apparently not seen since; also *Carex teretiuscula*. The clear spring-fed bog-holes here, filled with *Characeæ*, were a pleasant change from the dirty pea-soup-coloured waters of Lough Gur. I pushed on to a worked-out bog, full of deep holes, lying south of the lake. The pools yielded a fine haul of *Characeæ*, including *C. polyacantha*, also *Potamogeton coloratus*, *P. obtusifolius*, *Sparganium minimum*, and other additions to the Limerick flora. We drove back to Limerick delighted with our day's work.

Previous investigation having been almost confined to the limestone, we made for the Old Red Sandstone uplands of Slieve Felim the following morning. As on the previous day, the roadsides for miles were gay with the white umbels of *Pimpinella magna*. A halt at a roadside quarry-hole yielded *Lemna polyrrhiza* again. Beyond Cappamore we (Dr. G. Fogerty, Mr. O'Brien and I) alighted, and worked across the remains of a large bog, now almost entirely demolished. The typical bog-flora had nowhere survived the draining and cutting; *Osmunda* and *Lastrea spinulosa* were the best plants seen. Dr. Fogerty and Mr. O'Brien have since explored the less plundered bogs at Castleconnell, and filled a number of blanks in the Limerick list, for bogs are almost absent in that county. After lunch at Doon, we struck in among the hills, working chiefly up the fine glen of the Bilboa river. Satisfactory results were achieved in the addition of a large number of calcifuge plants to the list, though most of them possessed no special interest: the best plants found were *Rubus saxatilis*, *Agrimonia odorata* (new to VI.), *Carex pendula*, *Lastrea Oreopteris*, *L. æmula*. On our long drive home *Festuca Myuros* was gathered near Cappamore.

Next morning before breakfast Mr. O'Brien took me to see *in situ* the best of all the Limerick plants—*Scirpus triquetus*, which he had found only a few days before. As a British species this is extremely rare. It is confined to the tidal reaches of the Thames, the Arun in Sussex, and the Tamar, which separates Devon from Cornwall. And here, on the muddy foreshore just below Limerick Docks, Mr. O'Brien showed me the plant growing abundantly. The proximity to the shipping suggested the possibility of introduction; but Mr. O'Brien has set this point at rest by a series of explorations which show that it grows profusely on both banks of the Shannon for about five miles below Limerick, nor is the extent of its range yet fully defined. The discoverer had better be allowed to speak for himself:—"I took a boat and dropped down the river about five miles. There can be no doubt, I think, that it is native; it grows by the rood together, like grass, on both sides. I traced it down as far as the bottom of Tervoe reach on the Limerick shore, That may be its limit, as the water gets rougher there, but I expect to find it in the

Maigue and Bunratty River" (31-8-'00). "I went on Tuesday to Cratloe Creek on the Shannon (Clare side), but did not find *Scirpus triqueter* in the main river; there was one clump in the Creek . . . On Wednesday I went to Newtown, which is opposite Cratloe on the Limerick shore. There I could not find *S. triqueter* at all. You will understand that the river is very difficult to reach either by land or water, so that no thorough search is possible; but I think you may take it that abundant growth of the plant ceases at Coonagh lower light, and the point opposite where the river widens—that is, it is in Tervoe reach and no further" (7-9-'00.) It is impossible to refuse the plant a place in the indigenous list, and the finder is to be congratulated on making one of the most interesting additions of recent years to the Irish flora. We gathered good specimens of it, and growing hard by I was much pleased to find *Nasturtium sylvestre* again.

Thence to waste ground adjoining the docks, where Mr. O'Brien had an interesting lot of colonists to show, among which *Lepidium latifolium* and *L. Draba* were well established, and, according to him, spreading. Then across Carey's Road to a large disused quarry, now being filled up with rubbish, where a truly remarkable assemblage of aliens was to be seen. There were all kinds of plants here:—half-native plants which hang about towns and waste ground, such as *Brassica nigra*, *Lepidium latifolium*, *Nepeta Cataria*, *Chenopodium murale*; colonists like *Lepidium Draba* and *Melilotus arvensis*, Wallr.; confirmed casuals, such as *Saponaria Vaccaria*, *Malva parviflora*, *Melilotus alba*, *M. parviflora*, *Medicago falcata*, *Centaurea solstitialis*, *Cannabis sativa*; English plants which do not extend to Ireland, such as *Lythrum hyssopifolia*, *Centaurea Calcitrapa*, *Lactuca virosa*, and *Polypogon monspeliensis*; plants of Southern Europe, like *Nasturtium austriacum*, *Lepidium virginicum*, Gren. et Godr. (= *L. majus*, Darracq.), *Polygonum Bellardi*, *Asphodelus fistulosus* (the second a very rare plant, growing only at Bayonne); North American species, such as *Ambrosia artemisiæfolia* and the lovely grass *Panicum capillare*; and garden outcasts of various sorts, down to vegetable marrows and Virginian creepers.¹

¹ My best thanks are due to Mr. E. G. Baker, of the British Museum, for kind assistance in naming these foreign plants.

The morning train (save the mark!) conveyed Mr. O'Brien and myself to Askeaton, a straggling village on a small tidal stream with rocky limestone banks, and decorated with beautiful ruins. The flora here is striking: many of the plants are recorded in Mr. Stewart's report already referred to. A conspicuous group of doubtfully native plants first arrests the eye—*Feniculum*, *Verbena*, *Malva sylvestris*, *Silybum*; with them some native species, such as *Salvia Verbenaca* and *Dipsacus*. On the abbey ruins I was delighted to recognise *Euphrasia Salisburgensis*, hitherto in the British Isles on record from Clare, Galway, and Mayo only, though I have it also from Leitrim. Along the rocky banks of the river this Eyebright appeared again abundantly, growing as usual in dense clusters on bare patches of soil or on little eminences. The river-banks were full of good plants, such as *Cornus sanguinea*, *Calamintha officinalis*, *Spiranthes autumnalis*, *Allium vineale*, *Viola hirta*, *Geranium columbinum*, *Rubia*, the first four not in Mr. Stewart's list; neither is *Festuca Myuros*, which grew on old walls with *Orobanche Hederae*. *Papaver hybridum*, growing on the roadside, furnished another addition to the Limerick list. Mr. O'Brien next took me to Mullagh, where there is a considerable area of bare limestone crag, most tempting to the eye. A wet marsh which I waded here was tenanted by *Cladium*, *Juncus obtusiflorus*, *Utricularia vulgaris* and *minor*, *Potamogeton coloratus*, and *Chara polyacantha*, most of them wanted for Limerick. The flora of the crags proved characteristic, though curiously restricted. The thickets consisted chiefly of Hazel and Dogwood—no Buckthorn; the herbaceous flora of *Viola hirta*, *Poterium Sanguisorba*, *Carlina vulgaris*, *Euphrasia Salisburgensis*, all in immense abundance. On such ground it was most strange to see no *Geranium sanguineum*, *Asperula cynanchica*, *Sesleria*, or the other rarer plants which one associates with the West of Ireland limestones. *Geranium columbinum* was here again, unquestionably native, and *Rubus saxatilis*.

A nine-mile drive brought us finally to Curragh Chase, where we were joined by Canon O'Brien. This ground was visited also by Mr. Somerville last year, and it will well stand further working. We added to its flora *Nicotia Nidus-avis* and *Carex Pseudo-cyperus*, and in particular I was glad to find *Hypopithys Monotropa*, one of our rarest Irish plants, dis-

covered here by Dr. George Fogerty in 1897, but looked for in vain since. We enjoyed Canon O'Brien's hospitality that evening, and returned to Limerick by the night mail.

Early next morning Dr. G. Fogerty took me to another quarry, adjoining the railway, where a number of strange casuals were to be found, but the rich list of the Carey's Road quarry practically covered the ground. I caught the midday train to Dublin, and the detecting of *Linaria viscida*, *Diplotaxis muralis*, and *Arenaria tenuifolia* on the railway at Killonan finished for a time my botanizing in Limerick.

RECENT LITERATURE.

The Fauna and Flora of Valencia Harbour on the West Coast of Ireland (*Proc. Royal Irish Acad.*, 3rd ser., vol. v., 1900.)

In the spring of 1895, Mr. W. I. Beaumont, Mr. E. T. Browne, and Mr. F. W. Gamble visited Valencia Harbour for the purpose of investigating certain groups of marine invertebrates — “Medusæ, Turbellaria, Nemertea, and Nudibranchiata—which groups had received very little attention from previous workers on the west coast of Ireland.” Their efforts were so successful that in 1896 they again visited Valencia, and were accompanied this time by three additional naturalists, viz., Prof. F. E. Weiss, Mr. M. D. Hill, and Mr. A. O. Walker. This valuable paper gives an account of the results obtained in these two visits, and of a series of tow-nettings taken from October, 1896, to December, 1898, by the Misses Delap, of Valencia.

The various groups of animals collected and the Algae have been examined, and reports drawn up by competent authorities. Perhaps the most interesting of these reports is that on the Medusæ by Mr. Browne, who remarks that the medusoid fauna of Valencia Harbour is now better known than that of any other locality in the British area, and gives figures of the radial canal system of that interesting Medusa, *Dipleurosoma typicum*, Boeck. A large number of species are recorded which are new to the Irish Fauna, and two species new to science are described, viz., *Obelia nigra* (from the Medusa form), by Mr. Browne, and an unnamed species of *Lucernaria*, of which Mr. Beaumont promises us shortly a more detailed description. The few references to the previously known distribution of the species on the Irish coast are not, however, always quite accurate. *Lucernaria campanulata*, stated not to have been previously recorded from the coast of Ireland, happens to have been recorded from Bray, Miltown-Malbay, and the west coast in Thompson's *Natural History of Ireland*, and from Kerry by Dr. E. P. Wright in *Proc. Dublin Univ. Zool. and Bot. Assoc.*, vol. i. *Idalia Leachii*, which “does not appear to have been recorded from Ireland,” is mentioned by Mr. Alder in Jeffreys' “British Conchology” as having been found in Birterbuy Bay by Mr. Barlee.

A. R. N.

A List of the Marine Mollusca of Ireland. By A. R. NICHOLS, B.A. (Report from the Fauna and Flora Committee). *Proc. R. I. Academy* (3), v. No. 4. 1900.

The publication of Mr. Nichols's list of Irish Marine Mollusca marks another step in the advance of our knowledge of the Irish fauna, and supplies an implement which will be most useful to those of the craft—students of either zoology or palæontology. The records of Irish mollusca were brought together by Thompson in 1856, but the numerous papers and notes published in the intervening forty-four years were uncatalogued, and scattered through many Journals, and Proceedings of scientific societies. The recent publication of the important results of the Royal Irish Academy's dredging expeditions made it especially desirable that the whole of the literature should be brought together and condensed into one systematic paper, and this Mr. Nichols has done for us. For the purposes of showing distribution, Mr. Nichols has divided the Irish coast into six provinces, while he has adopted 1,000 fathoms as the bathymetrical limit of the Irish fauna. The submerged Ireland beyond the 100 fathom line thus added to our jurisdiction is larger than the island itself, extending far beyond the Porcupine Bank. One of the best features of the paper is its excellent bibliography of Irish mollusca. The nomenclature will horrify those who still use their Jeffreys, or Forbes and Hanley, but the numerous changes in the names of our molluscan favourites are necessary in order to bring us into line with the general advance of conchology. Mr. Nichols has mercifully added in brackets the familiar names of Jeffreys's "British Conchology" where these differ from the names now employed.

R. L. P.

A suggestion as to a possible mode of origin of some of the Secondary Sexual Characters in Animals as afforded by observations on certain Salmonoids. By G. E. H. BARRETT-HAMILTON, *Proc. Cambridge Phil. Soc.*, vol. x., 1900.

In a short paper Mr. Barrett-Hamilton discusses some of the current views as to the changes of colour or form which the males of many vertebrates undergo during the breeding season. He believes that there must be some fundamental cause to which all such cases owe their origin. Having had an opportunity of making observations on Salmon in the rivers of Kamchatka, he maintains that the abnormal coloration and growth during the breeding time are due to pathological conditions by which both sexes are affected.

Mr. Barrett-Hamilton suggests that we have in these phenomena a possible source and origin of many of the highly developed sexual characters met with in other animals, and that they may possibly be reminiscences of a former condition of things through which their ancestors passed.

R. F. S.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include an Otter from Mrs. Howard St. George, a Cockatoo from Mr. H. M. Winder, a Willow-Warbler from Mr. Bushe, a number of Carp and Trout from the Commissioners of Irish Inland Fisheries, fifty American Brook Trout and fifty Lochleven Trout from Mr. J. N. Lentaigne. A pair of Lories have been bought.

13,962 persons visited the Gardens during September.

BELFAST NATURALISTS' FIELD CLUB.

SEPTEMBER 8.—The last field meeting was held. The excursion included the ancient rath or tumulus at Dundonald, the Kemp stone cromlech, Newtownards Priory and Grey Abbey. A numerous gathering of members and friends were favoured with fine weather. Mediæval architecture seemed to be the chief object of quest, and the ancient Priory at Newtownards was first visited and critically examined, after which the ruins of the abbey—*De jugo Dei*—in the Ards, were investigated. Mr. J. J. Phillips (author of an illustrated monograph on the abbey) having kindly consented to act as cicerone to the Club in this part of the day's programme, briefly explained the plan of the abbey, commencing at the church.

DUBLIN NATURALISTS' FIELD CLUB.

AUGUST 4.—A small party of members and visitors attended the excursion to the Scalp. The party travelled to Carrickmines Railway Station by train, and walked from this point to the Scalp by the footpath over the hill. A considerable number of botanical specimens were obtained, the road near the station proving the best hunting ground.

SEPTEMBER 1.—The excursion to the North Bull was also botanical in character. *Suaeda maritima* and *Salicornia herbacea* were found in considerable quantity along the shore. The range of *Artemisia stelleriana* has considerably extended since the last visit of the Club, and *Statice spathulata* was found growing in great abundance on the marshy land near the rifle ranges.

SEPTEMBER 19.—The last excursion, as usual, took the form of a Fungus Foray, the locality chosen being Lord Massey's pretty demesne of Killakee, to which he kindly gave free admission to the Club. Although the afternoon was fine the attendance was not as good as could be wished, only 14 members and visitors being present. The cold and wet of the earlier portion of the autumn seemed to have had a prejudicial effect on the growth of Fungi, as the larger forms—Agarics, Boleti, &c.—were by no means numerous. Nevertheless a number of interesting things were met with, the best find being, perhaps, *Peziza (Otidea) onotica*. Amongst others, the following were identified by the President (Mr. Greenwood Pim):—*Armillaria mellea*, *Clitocybe laccata*, *C. infundibuliformis*, *C. fragrans*, *Tricholoma rutilans*, *Collybia confuens*, *Mycena*, one or two species; *Pholiota*

squarrosa, *Hebeloma rimosum*, *H. geophyllum*, *Hypholoma fasciculatum*, *Psathyrella disseminata*, *Coprinus comatus*, *Russula*, species; *Lactarius blennius*, *L. piperatus*, *L. hyssiginus*, *Boletus luteus*, *Clavaria rugosa*, *Corticium leve*, *Scleroderma vulgare*, *Lycoperdon celatum*, *L. pyriforme*, *Phallus impudicus*, *Peziza* (*Otidia*) *onotica*, *P.* (*Cochleata*) *aurantia*, *P.* (*Scutellinia*) *scutellata*, *Uncinula bicornis*, *Xylaria hypoxylon*, *Trochila lauro-cerasi*. *Myxomycetes* were fairly abundant, *Lycogala epidendrum*, *Didymium farinaceum*, *Areyria punicea*, and an undeveloped *Trichia* being noted.

CORK NATURALISTS' FIELD CLUB.

SEPTEMBER 19.—EXCURSION TO BLACKROCK.—The party walked along the shore by Lough Mahon, and the following plants were collected:—*Plantago Coronopus*, *Salicornia herbacea*, *Suaeda maritima*, *Statice spathulata*, and *Aster tripolium*, some specimens of which had the outer florets pure white.

NOTES.

BOTANY.

FUNGI.

Truffles in Ireland.

An interesting discovery has recently been made in County Galway by Major Elmitt, F.R.G.S., of Carrickfergus. Major Elmitt, who is a well-known figure in scientific circles, was for a long time certain that truffles ought to exist in the Western counties, and after much trouble and research he succeeded in discovering some in a wild and thinly-populated part of Galway. The next step, obviously, is to teach the Galway pig to hunt for truffles. All who are acquainted with the lean, high-backed, sharp-nosed, active "Old Irish" pig will agree that it is eminently fitted for the purpose.—*Belfast News-Letter*.

MOSESSES.

Moss Exchange Club.

We have received from the Secretary (Rev. C. H. Waddell) "Reports and Extracts from the Club Note Books for the years 1899, 1900," recently issued by the Moss Exchange Club; also List of Desiderata for 1901, List of British Sphagna, and Rules. From the reports the Club would seem to be in a flourishing condition. The membership is not large—between 30 and 40—but plenty of activity is manifested, as shown by the fact that in the two years over 5,000 specimens were sent in and distributed. Irish plants have been kept well to the front by Rev. H. W. Lett and Rev. C. H. Waddell.

PHANEROGAMS.

***Elymus arenarius* in Co. Dublin.**

While walking south along the railway from Killiney on the 29th September last I unexpectedly came across an abundant growth of this handsome grass in a new locality, about a quarter of a mile north of the Bray river. At this point the line closely skirts the shore, passing along the summit of a drift bank which falls steeply to the sea. Along the edge of this bank, right beside the permanent way, the grass spreads for fully 100 yards in a luxuriant growth, many of the plants reaching to fully 5 feet in height, with the characteristic flat leaves in some cases $\frac{7}{8}$ inch wide. Though mostly quite past flowering, here and there a plant appeared in second flower with spikes up to 10 inches in length. The usual habitat of the species; in the British Isles at least, is sandy sea-shores; here it flourished in rather tenacious drift material of clay and gravel, and in one spot some plants have pushed their way through the joints of the granite facing of the embankment. All the appearances are in favour of this conspicuous species having been long established in this station, and it is certainly remarkable that it should have so long escaped discovery at a point where passenger trains pass almost half-hourly and at a slow rate all the year round. The claim of *Elymus arenarius*, apparently a rare plant in Ireland, to a place in the County Dublin flora has hitherto rested on Mr. Hart's record for Skerries, dating from 1883. The plant still grows there, but much more sparingly than in the station just recorded.

N. COLGAN.

Dublin.

The march of *Matricaria discoidea*.

In the September number of the *Irish Naturalist* Mr. Colgan and Mr. Praeger put on record the presence of this floral invader in a number of the Irish counties. Mr. Praeger tells us that the invasion of Ulster by this alien is now fairly begun, and the burden of my present message is that the invasion is still progressing. That active member of the Botanical Section of the Belfast Naturalists' Field Club, Mr. Richard Hanna, has shown me a specimen gathered by him, last August, by the railway line between Lurgan and Portadown. This occurrence adds Armagh to the list of counties already enumerated.

S. A. STEWART.

Belfast.

***Poa compressa* again.**

This long neglected Irish grass has been found in still another locality, Mr. Richard Hanna, of Belfast, having gathered it, early in September, on an old wall near Doagh, County Antrim.

S. A. STEWART.

Belfast.

ZOOLOGY.

Naturalists in Sligo.

Two well known members of the Conchological Society, Dr. Chaster of Southport, and Mr. Collier of Manchester, have had a most successful ten days' collecting tour in the northern Lake District, in company with Messrs. Bigger, Stelfox, and Welch of the B.N.F.C., visiting Lower Lough Erne and its islands, the district south of Lough Macnean, Lough Gill, Glencar, and Inishmurry. The return home was made *via* Bundoran to visit the dunes where so many reversed, &c., Helices have been found, and with some success, Dr. Chaster finding one living specimen.

INSECTS.

A Braconid parasitic on *Anobium domesticum*.

Some time ago these beetles (*Anobium*) attacked the pedestal of a valuable table. I then applied carbolic acid and hoped to have stopped the mischief. Last year Mrs. Johnson informed me that the attack had recommenced, and brought me a small Ichneumon fly which she had found running about the table and which she was inclined to partly blame for the harm done. Last month she again drew my attention to the presence of these Pymenoptera, and having captured some specimens I sent them to Mr. E. Saunders who kindly forwarded them to Mr. Claude Morley, and he pronounces the insect to be *Spathius exarator*, L. *Anobium domesticum* is a small brown beetle which bores into wood, making little holes like shot holes. The beetle and its larva feed on the wood, and in course of time quite destroy it, eating away the solid substance and leaving a residuum of dust. In old houses they are often far too plentiful, and at times do much injury to woodwork and furniture. The beetle is one of the Death-watch tribe, the noise which it makes being supposed to be caused by its tapping with its head as a signal to its mate. It is very pleasing to know that so destructive an insect has a natural enemy in this Braconid, and I should recommend all householders when they observe a little fly, with what would be taken for a long and vicious-looking sting, hovering about a room, not to assault it with the poker or a slipper, but to allow it to pursue unmolested its appointed task of reducing the numbers of *Anobium*.

W. F. JOHNSON.

Poyntzpass.

Vanessa io in Co. Londonderry.

With reference to Miss Campbell's capture of the Peacock butterfly (*Vanessa io*) near Londonderry (*supra*, p. 246), I may mention having seen one many years ago at Kilderry in the same neighbourhood. I made a note of the occurrence at the time, but am unable now to lay my hand upon it.

W. E. HART.

Howth.

Noteworthy Irish Lepidoptera.

I have been notified of the occurrence of the Death's-head Moth, *Acherontia atropos*, either in the imaginal or larval condition, from various parts of the country this year, both in the Co. Cork, at Kells in Meath, and in this county of Monaghan, a full fed caterpillar having been brought to me so late as the 22nd September. Also it is interesting to find that *Vanessa io*, the beautiful Peacock butterfly, usually very rarely seen in the northern half of Ireland, has this year appeared in some numbers in this demesne; and also, I find from a correspondent, at Newry. I wish also to record the capture by Mr. R. Donovan of *Cucullia absynthii* flying to the blossoms of a lime tree this summer, near Timoleague, and from the same neighbourhood *Eupithecia pygmaea*, *E. constrictata*, and *E. togata*, all good finds.

WM. F. DE V. KANE.

Drumreask, Monaghan.

MOLLUSCS.

Scalariform *Helix nemoralis* living at Bundoran.

A very interesting article, it may be remembered, appeared in the *Irish Naturalist* of July, 1900, dealing with the abnormal shells of *Helix nemoralis*, by Mr. R. Welch, of Belfast, who for many years has devoted much time and care to the study of that variable shell. The sinistral and scalariform shells were particularly referred to, also the abundance with which these occur at Bundoran in comparison with the rest of the United Kingdom. Still, although a large number of the shells, particularly the type form, run into var. *conica*, it is the exception to find a true scalariform specimen. Those which have been obtained up to the present, as Mr. Welch remarks, have usually been found among the hollows of the great wind-swept sand-dunes, in all cases empty, and usually with the epidermis weathered off. Last September, however, I was fortunate enough to find a perfect full-grown specimen living. I had been searching close by the entrance to the dunes, a little beyond the Fairy Bridges, in a spot where my wife remarked that var. *conica* seemed very abundant, when I picked it up feeding on the short scrub which carpets the turf just below the sand-hills. On the theory that this monstrosity, being only a still further production of the variety (*conica*), would be most likely to occur again where the variety was most plentiful, I spent another morning about the same spot, and was rewarded by finding a second scalariform, this time, however, dead, within about ten yards of the place where I found the first. Though slightly weathered, the epidermis was still perfect enough to lead one to conclude that the animal had been recently living. Both shells were an abnormal production of the ordinary five-banded type, and I would not be surprised if careful searching turned up a few more about the same place.

WM. A. GREEN.

Belfast.

BIRDS.

The Ruff in Ireland.

It gives me the greatest possible pleasure to see in the pages of the (*Irish Naturalist* (*supra* p. 247), Mr. Ussher's remarks on my recent paper on the Natural History of the Ruff. I am only too glad to learn more of the subject in question from my brother ornithologists, and one of my chief objects in contributing articles to the *Irish Naturalist* has been to invoke discussion, enough of which it is a regrettable circumstance seldom arises. Mr. Ussher suggests that "the discontinuance of shooting in spring" may account for more recent absence of records at that time of year. This is true as far as records made from shot specimens are concerned, but if the Ruff during more recent years has been protected in spring its numbers as a vernal migrant should have tended to increase rather than diminish, and it at least should have been seen (even if not shot) by competent observers looking out for it, and yet we hear of no such observations for many years past. I am aware that it is often necessary to shoot a bird to identify it, but the Ruff in nuptial plumage is so conspicuous that a good observer with a field-glass should be able to satisfy himself as to its identity without at all times securing the specimen. Is it not likely that the decrease of Ruffs in spring in Ireland has accompanied a similar decrease in England, as we know that in the latter country the Ruff is now seldom observed, even as a vernal migrant and in counties where it formerly bred? According to Mr. Saunders, drainage has greatly restricted the haunts of the Ruff.

I certainly agree with Mr. Ussher's idea that the spread of interest in ornithology may go towards accounting for the greater number of records of the Ruff from the western part of Ireland, but in addition it is worth noting that during Mr. Warren's residence for many years in Killala he did not obtain a specimen till 1884, and that from Sligo. Since then several Ruffs were taken in Connaught (as tabulated in my article), and I am not aware that these birds were shot by people very specially interested in the science of ornithology, but rather by sportsmen looking for grouse and such like.

Lastly, Mr. Ussher says he cannot concur with my remark that sportsmen, as a rule, *are keen observers*, and hence few strange birds pass them unnoticed. I do not mean that sportsmen are at all *accurate* observer. They often shoot a species because they do not know what it is. In this way we are indebted to them for many records of more or less rare birds, sometimes really rare ones.

I know a gentleman who some short time ago shot a Squacco Heron. He said he shot it because he did not know what it was. He was, to my mind, a keen observer, because he saw the bird, but not an accurate observer, as he did not know it. I have received examples of Water Rails, Nightjars, Short-eared Owls, and other species detected by the sharp eye of the sportsman, and shot birds which an ordinary observers might altogether overlook. Are we not indebted to sportsmen for sending to our markets rare birds from time to time, which subsequently

have been secured and identified by scientific ornithologists? I conclude by thanking Mr. Ussher for the interest he has taken in discussing the subject.

CHARLES J. PATTEN.

Trinity College, Dublin.

Common Bittern in Co. Down.

On Thursday, 9th August, 1900, a Common Bittern (*Botaurus stellaris*), was shot at Groomsport, by Mr. Walter Smyth, while he was walking along the sea-shore.

Belfast.

ROBERT PATTERSON.

Early arrival of Redwing.

When on a bog near Coagh, Co. Tyrone, on 2nd October, three Redwings (*Turdus iliacus*) flew past me. They were flying low, in a south-westerly direction, and were fairly close to me.

Belfast.

ROBERT PATTERSON.

MAMMALS.

The Vision of Whales.

Mr. John Brown's allusion in the October number of the *Irish Naturalist* to my communication on the local Cetacea, which appeared in the August number, has re-directed my attention to this subject. In conversation about it this morning with Mr. Wm. Crawford, of Craigavad, who has had many opportunities, when sailing and fishing in this lough, of observing its inhabitants, he expressed the very decided opinion that whales could see above water. Many years ago, before the lough was as disturbed as it now is by steamers, the whales were, if not more numerous, at least more approachable; and Mr. Crawford said he has often seen them, fifty or sixty feet long, lying quiet, not more than fifteen to twenty yards off; and he added, "we were sure the beggars were looking at us." Among my books the only reference I have yet found to whales looking about them is in one of the prize essays sent in to the International Fisheries Exhibition at Edinburgh in 1882 (Blackwood and Sons, Edinburgh, 1883, p. 7.) The essay in question, on "Whale fishing in the Faroe Isles," was contributed by Sysselmand H. C. Müller, of Thorshaven, and in it he states, with reference to the pursuit and capture of a herd of Pilot Whales, "Now and then some of the whales stand erect in the water, with their heads above the surface, seeming to spy." I am aware that neither of these statements answers the scientific part of the question raised by Mr. Brown, and I should welcome further information on the subject. Meantime we know that seals, which lead an amphibious life, must be able to adapt their eyes to seeing both above and below water. I watched a seal for quite a long time a couple of days ago off Cultra Point, half a mile from here, and each time it rose its head was projected a foot or more above the surface, and it turned looking round it in all directions, sometimes showing the dark back of the head, and again the lighter fawn colour of the throat.

Holywood.

R. LLOYD PATTERSON.

MAMMALS.

Natterer's Bat in Co. Antrim.

On July 24th, 1900, I received from my friend, Mr. H. L. Orr, a Natterer's Bat (*Vespertilio Nattereri*, Kuhl.). It was captured at Woodburn Glen, near Carrickfergus, Co. Antrim, and I believe is the first recorded in this county.

ROBERT PATTERSON.

Belfast.

GEOLOGY.

Irish Fossils.

Two important monographs, dealing, the one partly, the other wholly, with Irish fossil mollusca, progress in the publications of the Palæontographical Society. In vol. liii. (For 1899) Dr. Wheelton Hinde's "British Carboniferous Lamellibranchiata" reaches its fourth part, the families treated of being the *Edmondidae*, *Cyprinidae*, and *Crassitellidae*. To this volume Dr. Foord has not been able to contribute the third part of his "Carboniferous Cephalopoda of Ireland." The last published instalment of this important work will be found in vol. lii., and deals with the straight and curved *Orthoceras*-like forms.

The foraminiferal deposits of Dog's Bay, Co. Galway.

An important paper on "Mechanically-formed Limestones from Junagarh (Kathiawar) and other Localities," by Dr. J. W. Evans, F.G.S., appears in the *Quarterly Journal* of the Geological Society of London, vol. lvi., pp. 559-589 (August, 1900). Junagarh is built thirty miles from the sea, on a limestone formed of small rounded grains, which are really "organic calcareous particles derived from shallow-water organisms of recent types. Each particle is ordinarily surrounded by an envelope of deposited carbonate of lime." Dr. Evans, aided by Mr. F. Chapman's microscopic investigation of the organisms, concludes that the limestone has been formed by the action of wind, which has sifted out the smaller organisms and grains from a shore-deposit, and has carried them to form new beds inland. At that time (p. 573) Junagarh was probably close against the shore. Dr. Evans supports his argument by a careful description of the foraminiferal deposits of Dog's Bay on the south-west coast of Co. Galway (p. 576; see also Mr. Chapman's account, p. 588), drawn up from letters written by Mr. R. Welch, and from papers in the *Irish Naturalist*, vols. iv., vii., and ix. Mr. Welch's observations, which are always placed so freely at the disposal of other scientific workers, are fittingly enshrined in a paper of such wide geological application. Dr. Evans concludes by suggesting that some of our British oolitic deposits were similarly accumulated by æolian action.

G. A. J. COLE,

Dublin.

THE DISAPPEARANCE OF THE FOX FROM CO. ANTRIM.

BY ROBERT PATTERSON, F.Z.S.

By the kindness of the Earl of Antrim I have been permitted to examine an old "Court Leet" Book for the Manor of Glenarm, and I have been much struck by the evidence therein of the great numbers of Foxes that formerly existed in Co. Antrim. Thinking that the information might be of interest to readers of the *Irish Naturalist*, I have been at some pains to decipher the faded—and often nearly illegible—writing, and now give a summary of the results.

The "Manor of Glenarm" extended from the town of Larne to Glendun River—practically what is known now as the Baronies of Upper and Lower Glenarm—a narrow strip on the extreme east of Co. Antrim, about 22 miles long by about 6 miles average breadth. The Courts were held twice a year, in spring and autumn, and the records in this volume begin in 1765 and end in 1812. Passing over entries of purely antiquarian and ornithological interest, we come upon innumerable records such as the following:—

"17th day of November, 1765.

"We psent the Sum of one pound four shills to be
"Levyed off the inhabitants of the parish of Ardilenish and
"paid to Daniel McVicar for killing twelve foxes of prey.

"We psent the Sum of one pound twelve shills to be
"Levyed off the inhabitants of parish of Laid and paid to
"Daniel McVicar for killing sixteen foxes of prey.

"We psent the Sum of two Shillings to be Levyed off the
"inhabitants of the parish of Carncastle and paid to Thomas
"Palmer for killing one old fox."

Thus two shillings a head was the reward, whether the animal was a "fox of prey," or merely an "old fox."

The following is the number of Foxes “presented” and paid for in the different years :—

1765, . . . 42 Foxes.	1774, . . . 53 Foxes.
1766, . . . 51 „	1775, . . . 46 „
1767, . . . 46 „	1776, . . . 4 „
1768, . . . 57 „	1777, . . . 54 „
1769, . . . 52 „	1778, . . . 22 „
1770, . . . 70 „	1779, . . . 76 „
1771, . . . 51 „	1780, . . . 32 „
1772, . . . 29 „	1781, . . . 26 „
1773, . . . 67 „	

“1st day of May, 1782. We the Grand Jury of the Barony of Glenarm are determined for the future not to allow any money for killing foxes, as they are paid for at the Assizes, the Bailiffs are ordered to let this our Resolution be known to the Country.”

“14th day of May, 1783. As wee understand that the Grand Jury at last Assises would not pay for anny Foxes, now the Jury of Glenarm means to Continue the Premium as formerly and that the Bailifs should inform the Country of the same.”

1783, . . . 15 Foxes.	1786, . . . 34 Foxes.
1784, . . . 30 „	1787, . . . 34 „
1785, . . . 43 „	1788, . . . 7 „

The sudden drop in numbers here seems to have been caused by a misunderstanding as to the responsibility for payment, for on 2nd May, 1792, we find the following :—

“Whereas several people have lately been disappointed at the Assizes in not getting any thing for Killing Foxes—Resolved by the Grand Jury now present, That all persons Killing Foxes in this Barony in future, on Presenting them at the Courts Leet as usual, will be paid an English Half Crown for each.”

This seems to have had the desired effect, for at the next Court, *only six months later*, we find 57 Foxes were paid for !

1793, . . . 52 Foxes.	1794, . . . 70 Foxes.
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After paying £8 15s. for Foxes in one year, the Grand Jury must have thought the amount too large, for at the same Court, held on 12th November, 1794, we read: “We agree only to Pay the sum of two shillings and two pence for Each fox and to be levied of the Parrishes they are killed in.”

The people resented this reduction by only producing 7 Foxes in 1795.

1796, . . . 36 Foxes.	1805, . . . 14 Foxes.
1797, . . . 25 „	1806, . . . 30 „
1798, . . . 21 „	1807, . . . 13 „
1799, . . . 8 „	1808, . . . 5 „
1800, . . . 30 „	1810, . . . 20 „
1801, . . . 31 „	1811, . . . 26 „
1802, . . . 20 „	1812, . . . 23 „
1803, . . . 33 „	

Thus in forty-seven years we get the enormous total of 1,462 Foxes produced at the Courts Leet for this small portion of Co. Antrim only, for which the “Manor of Glenarm” paid the sum of £159 4s. 6d.

Coming to more recent years, Thompson in his “Natural History of Ireland,” vol. 4, page 12, says: “The fox is still found in suitable localities throughout the island, wherever it can remain in spite of man.” But he does not mention any occurrences in Co. Antrim, although he records the killing of 400 Foxes in Co. Down between 1827 and 1851.

The B.N.F.C. “Guide to Belfast,” published in 1874, says Foxes “seem to be rapidly decreasing before the gamekeeper’s gun and shepherd’s trap.”

Lord Antrim informs me that the only Fox he ever heard of in the two Baronies was killed in his deer-park about the year 1870. It was running with a rabbit trap on one of its legs, and a wood-cutter killed it with a stick. The skin was preserved. Lord Antrim is convinced there is not now a single Fox in the two Baronies, nor has there been any since the 1870 capture. Even this one is supposed to have been “turned out” by the late Mr. Chaine, for hunting purposes. Mr. Sheals, the well-known Belfast taxidermist, informs me he cannot remember having received any Foxes from Co. Antrim.

Finally, in the whole of Ulster there is not one pack of Fox-hounds, although there are two packs of Stag-hounds, and eleven packs of Harriers, to satisfy the hunting proclivities of the Northern gentry, who would doubtless hunt Foxes if there were any Foxes to hunt.

Malone Park, Belfast.

SOME ADDITIONS TO THE BEETLES OF THE
DUBLIN DISTRICT.

BY J. N. HALBERT.

DURING the last five years a good deal of additional information has been acquired concerning the beetle fauna of the Dublin and Wicklow district. Quite a number of rare and unrecorded species have been met with during this time, so that a supplementary list is necessary, in order to bring our district-records up to date. My own field-work during this time has been almost altogether restricted to a more thorough investigation of a few localities, most of which have been favourite hunting-grounds for collectors in former years. Notably the marshes and sandhills on the north coast at Portmarnock, the Dodder valley between Templeogue and the Dublin hills, and the North Bull sands in Dublin Bay. I have also taken the liberty to include in our district list some insects which have occurred on the coast of Meath between Laytown and the Boyne mouth, as the addition of this few miles of coast will give us a claim to many interesting species.

The working of the North Bull is due to a suggestion of Mr. Praeger's that the insect fauna and flora of this isolated sandbank should be carefully examined, in view of its comparatively recent formation. As this undertaking will require some time for its completion it seems desirable to record some of the rarer species which have been found there up to the present time. All of the species recorded from Dundrum were taken a few years ago by Mr. F. H. Bullock, many of these he has kindly presented to the Dublin Museum.

Over ninety per cent. of the following records are additions to the Dublin district list, and of these about thirty species have not been previously recorded from Ireland; the latter are indicated by an asterisk. I have again to thank Dr. D. Sharp and Mr. G. C. Champion for much kind help in the naming of critical species. In the matter of nomenclature the "Catalogue of British Coleoptera" of Sharp and Fowler (1893), has been followed.

Carabus glabratus, Payk.—Rare on the Dublin hills; found under moss at the roots of trees, Tibbradden.

Dyschirius æneus, Dej.—Portmarnock, occurs on the banks of brackish ditches along with *D. salinus*, Schaum.

- Amara rufocincta**, Dej.—One specimen found near the end of the North Bull sands.
- A. lucida**, Duft.—Not common.
- Bembidium normannum**, Dej.—Portmarnock, under stones on the shore; *B. æneum*, Germ., and *B. varium*, Ol., are not uncommon under moss on the banks of the stream in the same locality.
- ***B. anglicanum**, Sharp.—Dodder banks, near Templeogue. I found this northern species commonly under stones in June, 1895.
- B. affine**, Steph.—Rare, in the same locality as the preceding.
- B. punctulatum**, Drap.—Blessington and Killiney strand.
- Æpus marinus**, Ström.—Shore at Dollymount.
- Haliphus flavicollis**, Sturm.—Royal and Grand Canals, common.
- Bidessus minutissimus**, Germ.—I captured a specimen of this very rare water-beetle amongst Water-Thyme (*Elodea*) in the River Camac, near Clondalkin, on the 12th of last August. There would seem to be some doubt as to the origin of the original British specimens of this species, which were said to have been taken in rivers near Cork (Wollaston, *Ent. Mo. Mag.*, vi., p. 141.) But it now proves to be rather widely distributed in Ireland, as I have taken specimens in the Sheen River, near Kenmare, in the month of April.
- Cœlambus confluens**, F.—Quarry holes near Lucan and Clontarf.
- Hydroporus septentrionalis**, Gyll.—Common in Lower Lough Bray.
- H. Davisii**, Curt.—Once found in the stream near the Little Dargle.
- H. lituratus**, F.—Local.
- H. discretus**, Fairm.—Royal Canal, in spring.
- H. vittula**, Er.—Lucan, ponds on the Grand Canal bank.
- Agabus guttatus**, Payk.—Dundrum.
- Ilybius obscurus**, Marsh.—Royal Canal, a pair captured in May.
- Rhantus bistriatus**, Berg.—Taken by Mr. G. P. Farran in a bog-pool on Kippure Mountain, in the same locality where he discovered *Agabus arcticus*, Payk, in the summer of 1896 (*Irish Nat.*, vi., 86.)
- Gyrinus elongatus**, Aube.—Raheny Ponds, &c.; much rarer than *G. natator*, in this district.
- G. opacus**, Sahl.—Royal Canal, in early summer.
- ***Helophorus Mulsanti**, Rye.—Portmarnock; one in a salt-marsh.
- ***Octhebius auriculatus**, Rey.—I first met with this local species near Laytown, on the coast of Meath. Again, in the summer of 1898, it occurred on the North Bull, under the mud in places where there had been small shallow pools, along with numbers of *O. marinus*, *O. bicolon* and *O. pubescens*.
- ***O. Lejolsi**, Muls.—Greystones. This interesting species, but recently added to the British list, was taken in some numbers by Mr. G. H. Carpenter from stagnant rock-pools, near the coastguard station, in the beginning of June, 1897. It has been recorded only from the French coast, and the extreme S.W. of England.
- Cercyon terminatus**, Marsh.—Local, in flood refuse.

***Aleochara succicola**, Thoms.—Taken by Mr. Farran in refuse from the Dodder, and by myself at Portmarnock; named by Mr. Champion. *A. grisea* occurs on the shore at Kilcool and Killiney.

***Oxypoda alternans**, Grav.—Ovoca and Powerscourt common in fungi, along with *Bolitobius binotatus*, *B. exoletus*, and *B. pygmaeus*.

***O. Waterhousel**, Rye.

***Ischnoglossa prolixa**, Grav.

***Homalota pavens**, Er.

H. villosula, Kr.

Obtained from moss in the Dundrum district by Mr. F. H. Bullock. The species were identified by Mr. Champion, and are now in the Dublin Museum collection.

H. luridipennis, Mann.—Found on the Dublin hills. I am indebted to Dr. Sharp for the naming of this and the five following species:—

H. longula, Heer.—Killiney strand, on the bank of a small stream.

H. monticola, Thoms.—Taken at the Scalp.

H. corvina, Thoms.—Ovoca, in fungi.

H. atricolor, Sharp.—North Bull; a specimen queried as a dark variety of this species by Dr. Sharp. I have taken a similar form on the Rosslare sands, Co. Wexford.

H. nigra, Kr.—Laytown sandhills.

Ocyusa incrassata, Kr.—Howth Demesne, found in moss in early spring, along with *Leptusa fumida*.

***Xenusa uvula**, Er.—Greystones, taken in rock-pools by Mr. Carpenter

Gyrophæna lævipennis, Kr.—Ovoca, in fungi.

Phytosus balticus, Kr.—Coast of Meath, abundant in decaying star-fishes, along with *P. spinifer*, Curt.

Oligota punctulata, Heer.—Bed of the Dodder, with *O. inflata*, Mann.

Conosoma pubescens, Grav.—Ovoca.

***Lamprinus saginatus**, Grav.—Tallaght, obtained in moss from the Dodder banks in April.

Heterothops binotata, Er.—Local, on the Dublin coast.

Quedius puncticollis, Thoms.—Swept off larches near Blessington.

Q. fumatus, Steph.—Powerscourt, taken by Dr. Scharff.

Q. umbrinus, Er.—Templeogue, found in flood refuse from the Dodder last September by Mr. Farran. This is a local species in Ireland, the only record is Killarney, but I have taken a specimen on the summit of Leenane Mountain, Co. Galway, in April.

O. attenuatus, Gyll.—Local.

Ocypus compressus, Marsh.—Dundrum.

Philonthus intermedius, Boisd.

P. carbonarius, Gyll.

P. albipes, Grav.

P. cephalotes, Grav.

P. sordidus, Grav.

P. debilis, Grav.

P. longicornis, Steph.

P. umbratilis, Grav.

P. nigrita, Nord.

P. micans, Grav.

Though unrecorded, all of these species occur more or less locally in the Dublin district. *P. nigrita*, Nord., is rare, specimens were obtained from wet moss near the Raheny Ponds. *P. albipes*, Grav., occurs on the North Bull.

- ***Xantholinus fulgidus**, F.—Dundrum, taken by Mr. Bullock.
Othlus myrmecophilus, Kies.—Howth, &c., in moss.
Stillicus similis, Er.—Templeogue, found in flood refuse by Mr. Farran; named by Mr. Champion.
 ***Medon obsoletus**, Nord.—Dundrum, taken by Mr. Bullock along with *Lithocaris ochracea*, Grav.
Dianous cœrulescens, Gyll.—Dodder banks near Tallaght, and other mountain streams. Found resting on stones close to the water in bright sunshine.
Stenus canaliculatus, Gyll.—Local.
S. crassus var. **littoralis**, Thoms.—Occurs on the shore at Portmarnock.
 ***S. picipennis**, Er.—Tallaght, a specimen swept off flowers.
Bledius fracticornis, Payk.—Portmarnock. I found a numerous colony of this local species in the drier part of a salt-marsh in May, 1895.
B. opacus, Block.—North Bull, along with *B. arenarius*, Payk.
Oxytelus maritimus, Thoms.—Found under pieces of wood on the North Bull strand, and at Laytown.
O. sculptus, Grav.
O. complanatus, Er. } Common.
Trogophicæus elongatulus, Er.—Lucan quarries, off water-plants.
T. tenellus, Er.—Dodder Banks.
Lesteva longelytrata, Goeze.—Blessington, in refuse from Liffey.
Micralymma brevipenne, Gyll. — Greystones, taken by Mr. Carpenter.
Omalium Allardi, Fairm.—Dundrum, along with *O. concinnum*, Marsh.
O. excavatum, Steph.—Local, marshy places.
O. cæsum, Grav.—Sandhills at Portmarnock and Laytown.
Tychus niger, Payk. } Local.
Bythinus bulbifer, Reich. }
 ***Bryaxis Waterhousei**, Rye.—Portmarnock, under stones on a grassy bank close to high-water mark. According to Fowler this species has not been found north of the London district.
 ***Euplectus sanguineus**, Denny. } Dundrum, taken by Mr. F. H.
 ***Euconnus fimetarius**, Chaud. } Bullock.
 ***Scydmaenus scutellaris**, Müll.—Tallaght, found in a nest of the small black ant (*Lasius niger*) on the Dodder bank.
Choleva Wilkini, Spence.—Occurred in fungi from Co. Wicklow.
C. nigrita, Er.—Laytown sandhills. Verified by Mr. Champion.
Hister purpurascens, Herbst.—North Bull, a specimen from this locality is referable to the rare variety *niger*, Er.
H. neglectus, Germ.—Local, occurs on the coast.
H. xii.-striatus, Schr.—Found commonly at Dundrum by Mr. Bullock, along with a few *H. bimaculatus*, L.
Saprinus maritimus, Steph.—North Bull, Kilcool, &c.
Acritus minutus, Herbst.—Dundrum
 ***Corylophus sublævipennis**, Duv.—Portmarnock sand hills.

Serloderus lateralis, Gyll.—Templeogue and Dundrum.

Epuræa deleta, Er.—Local in fungi.

Omosita colon, L.—Portmarnock.

Pocadius ferrugineus, F.—Dundrum.

Melgethes lumbaris, Sturm.—Rare.

M. pilipes, Sturm.—Somewhat local, on brambles.

M. obscurus, Er.—Avondale.

M. erythropus, Gyll.—North Bull; swept off flowers.

Cychramus lutens, var. **fungicola**, Heer.—Ovoca, from fungi in woods.

Rhizophagus cribratus, Gyll.—Little Dargle, under stones near conifers; *R. perforatus*, Er., occurs locally about Dublin.

Corticaria pubescens, Gyll.—Tolka valley in spring, Dr. D Freeman.

C. crenulata, Gyll.—North Bull, a specimen found on the golf-links in the month of May.

Cryptophagus lycoperdi, Herbst.—Killiney strand.

***C. saginatus**, Sturm.—Local.

***C. cellaris**, Scop.—North Bull.

C. distinguendus, Sturm.—Laytown sandhills.

C. bicolor, Sturm.

Atomaria apicalis, Er.

A. analls, Er.

A. ruficornis, Marsh.

} Dundrum, taken by Mr. Bullock;
species identified by Mr.
Champion.

Elmis Volkmarl, Panz.—River Liffey, near Blessington.

Heterocerus flexuosus, Steph.—North Bull, under stones, in the month of July.

Aphodius nitidulus, F.—Templeogue, taken in flood refuse from the Dodder by Mr. Farran, along with *A. erraticus*, L., and *A. fæstens*, F., The last-mentioned species occurs on the North Bull sands in autumn.

***A. plagiatus**, L.—North Bull salt-marsh. I found this local species in numbers under dried mud in the summer of 1898, all of the unicolorous black variety. It has not been recorded from the mainland.

A. porcus, F.—Dundrum, Portmarnock, and the Laytown sandhills; found singly and always in the autumn months.

Trox scaber, L.—Taken by Dr. R. F. Scharff near Dundrum.

Melolontha hippocastani, F.—A specimen taken by sweeping herbage on the coast of Meath.

Throscus dermestoides, L.—Liffey banks at Lucan.

Hydrocyphon deflexicollis, Müll.—Templeogue.

Scirtes hemisphæricus, L.—Raheny Ponds off *Equisetum*.

Telephorus figuratus, Mann.—Lucan, in the demesne.

T. darwinianus, Sharp.—This interesting species was first discovered on the Dublin coast, near Dollymount, by Messrs. Brooks. I subsequently found it under stones in the same locality, close to high-water mark. The only other Irish locality on record is the Foyle district, where Mr. C. W. Buckle has taken it abundantly.

- Thanasimus formicarius**, L.—Grand Canal Dock, several found in a tree trunk said to have come from central Ireland.
- Ptilinus pectinicornis**, L.—The remains of this species were found in a tree stump near Artane by Mr. Farran.
- Octotemnus glabriculus**, Gyll.—Dundrum.
- Strangalia armata**, Herbst.—Abundant at the Dargle, July.
- Lelopus nebulosus**, L.—Beaten off oak trees in the Lucan demesne.
- Donacia versicolore**a, Brahm.—Raheny Ponds, and in a marsh by the Liffey near Blessington.
- D. thalassina**, Germ.—Royal Canal, near Dublin.
- D. vulgaris**, Zsch.—Rare. I have taken single examples in the Royal Canal, Raheny Ponds, and in the quarry holes near the village of Crumlin.
- Chrysomela hyperici**, Forst.—Local; found in the Devil's Glen by Mr. Carpenter.
- Phædon armoraciæ**, L.—Rare.
- Adimonia tanacetii**, L.—Templeogue; once found in a spider's web.
- Lochmæa crataegi**, Forst.—Portmarnock; abundant on hawthorn blossoms in May.
- Galerucella sagittariæ**, Gyll.—Occurs in the Royal Canal.
- Longitarsus piciceps**, Steph. }
L. femoralis, Marsh. } Very local; the two last occur on
L. gracilis, Kuts. } the coast.
L. lævis, Duft. }
- ***Phyllotreta consobrina**, Curt.—Kingstown. Mr. T. Porter found this species in vast numbers, destroying turnips, &c., in the summer of 1898. See Mr. G. H. Carpenter's "Report on Economic Entomology" for that year. Mr. Champion has kindly verified this determination, referring the specimens, which were not quite typical, to a dark variety of *P. consobrina*, Curt. Curiously enough the species had not been previously noticed in Ireland.
- Psylliodes marcida**, Ill.—North Bull sands.
- Tenebrio molitor**, L.—Dublin.
- Rhinosimus viridipennis**, Steph.—Dundrum, under elm bark.
- ***Choragus Sheppardi**, Kirby.—Templeogue, taken by Mr. Farran last September. Identified by Mr. Champion.
- ***Apion rubens**, Steph.—Woodlands, Co. Dublin.
- ***A. stolidum**, Germ.—Laytown sandhills.
- Otiorrhynchus auropunctatus**, Gyll.—This most interesting weevil has now occurred as far south as Co. Wicklow (*Irish Nat.*, vol. ix., p. 108). I have taken it abundantly at Portmarnock and Santry by beating hedges of hawthorn, ash, and privet. It seems probable that the insect recorded as *O. tenebricosus*, Herbst., in Hogan's Dublin list, may have been in reality the present species, as the two insects bear a superficial resemblance to each other. The locality where *O. tenebricosus* is said to have been found—Baldoye—has been repeatedly worked, but we have never succeeded in finding it

there, nor has it occurred elsewhere in Ireland. On the other hand *O. auro-punctatus* is common near Baldoyle. It is interesting to note that the species has not yet been detected in either England or Scotland.

O. muscorum, Bris.—Portmarnock, along with *O. ovalus*, L., which is a much rarer species in this locality.

Trachyphlœus scaber, L.—Taken near Tallaght by Dr. Scharff.

Cænopsis Waltoni, Schön.—Ovoca, in woods.

Brachysomus echinatus, Bonsd.—Local.

Orobilis cyaneus, L.—Portmarnock.

Acalles turbatus, Boh.

A. ptinoides, Marsh.

} Dundrum.

***Ceuthorrhynchidius mixtus**, Muls.—A specimen of this insect occurred on the Laytown sandhills, coast of Meath. This specimen which was taken by sweeping plants, remained in my collection for two or three years, until Mr. Champion identified it as the above species. In Great Britain it is only known to occur in Devon and Lincolnshire.

***C. Dawsoni**, Bris.—Found by searching about the roots of plants on the shore at Portmarnock.

Eubrychius velatus, Bech.—Grand Canal, Dublin; and near Monasterevan.

Rhopalomesites Tardyi, Curtis.—Taken abundantly near Dundrum and Balbriggan.

***Caulotrypis æneopiceus**, Boh.—Mr. C. W. Buckle got a nice series of this local weevil out of an old ash tree at Portmarnock.

***Codiosoma spadix**, Herbst.—South Bull, found in a piece of wood, lying on the shore, by Mr. Bullock.

The following species occur among some insects presented to the Dublin Museum by Mr. H. G. Cuthbert. They were all taken by him in south Louth:—

Helophorus rugosus, Ol.—Termonfeckin strand.

Procadilus ferrugineus, F.—Clogher Head; found in a "puff-ball."

Læmophlœus ferrugineus; Steph.—One specimen.

Malthinus fasciatus, Ol.

***Mezium affine**, Boield.—This curious insect occurred in an old fishing-tackle box, which had been lying by for years. It would seem to be an introduced species in some localities.

***Anobium paniceum**, L.

Lema septentrionis, Suffr.

Science and Art Museum, Dublin.

NEW STATIONS FOR RARE PLANTS.

BY R. LLOYD PRAEGER, B.E.

THE following notes of rare plants would not in the ordinary course obtain publication in the notes on my own recent field-work ; and they appear to deserve a more extended notice than I can hope to give them in "Irish Topographical Botany."

Nasturtium sylvestre, L.—Messrs. W. West and W. N. Tetley, of Portora Royal School, informed me last July that they had gathered this at Belleisle, on Lough Erne, where they found a large bed of it ; and they have since forwarded specimens in confirmation of their statement. The plant was recorded by Mackay (*Syst. cat. rare plants*) in 1806, as found on Lough Erne by Dr. Scott ; and the only confirmatory evidence of its existence there lay in an immature specimen gathered at Belleisle by Mr. Barrington (Barrington and Vowell: Report on the Flora of the shores of Lough Ree, 1887), and doubtfully referred to this species. Its occurrence in the northern half of Ireland is now for the first time placed beyond doubt.

Arabis hirsuta, Scop., var. **glabrata**, Syme.—Mr. A. Bennett so names good specimens grown from plants gathered on the Great Island of Aran in 1895 as *A. ciliata*. Both plants have been recorded from Aran, the latter by Hart (*A List of Plants found in the Islands of Aran*, 1875), the former in *Eng. Bot.*, ed. 3, I., 168. Rev. E. S. Marshall writes that he considers the common West of Ireland *A. hirsuta* is not the English *A. hirsuta*, and suggests that it is *A. ciliata*, var. *hispida*, Syme. Between glabrous *hirsuta* and hispid *ciliata* there appears to be a good chance of a very pretty muddle, and botanists visiting the West of Ireland would do well to gather a good series of any *Arabis* they find there, for critical examination.

Geranium pusillum, L.—I am glad to be able to record two new stations for this, one of our rarest Irish plants. In June last Mr. Joseph Meade sent me specimens from cultivated ground at Old Connaught, near Bray, and in the autumn he again sent me living examples from waste ground not far off.

A doubtful scrap of a *Geranium*, in the herbarium of Mrs. D. D. Persse, collected a few years ago near Ballinrobe, appeared to belong to this species. Mr. Stanhope Kenny kindly revisited the spot last autumn under Mrs. Persse's directions, and sent me therefrom an undoubted specimen of *G. pusillum*.

Medicago sylvestris, Fries.—(See *I.N.*, v., 249, 1896). On going through the Irish herbarium in the Science and Art Museum I find a specimen of this plant labelled "*Medicago sativa*. Portmarnock, September, 1867." The handwriting shows it to be from the herbarium of Rev. H. G. Carroll. A more robust specimen, which I can only refer doubtfully to this species (neither specimen is in fruit) is labelled "*Medicago falcata*. Sandy fields near Baldoye; July, 1846. *Ex. herb.* Dr. Steele." Another hand has altered the name to *sativa*.

These specimens are interesting as showing proof that the plant has grown at Portmarnock certainly for over thirty years, and probably for at least half a century.

Artemisia maritima, L.—Mrs. Frank Joyce sends this (June, 1900), from the coast beyond Barna, W. Galway, an interesting addition to the flora of District VIII.

Scrophularia umbrosa, Dum.—In my own herbarium I find a specimen of this plant gathered by the Liffey, above the Salmon-leap at Leixlip, Co. Kildare, on the occasion of the Dublin Nat. Field Club excursion in August, 1894, but not recognised at the time. Its only other Irish stations lie a little further down the river in Co. Dublin, where it was found and identified by Mr. Colgan in 1895 (*J.N.*, v., 182, 1896.)

Spiranthes Romanzoviana, Cham.—I received last September from Mrs. Crookshank, The Warren, Portrush, a specimen of this extremely rare orchid, gathered in a new station near Kilrea, Co. Derry. Mrs. Leebody's station lay by the river, about a mile below Kilrea (*J.N.*, ii., 228, 1893). Mrs. Crookshank's locality is close to the town.

Cephalanthera ensifolia, Rich.—Mr. W. F. de V. Kane sent me in June, 1898, an orchid gathered close to Pontoon Bridge, West Mayo. The specimen arrived in so battered a condition, owing to an accident in transport, that I was afraid to name it definitely; but after a minute examination Mr. Rolfe has no hesitation in saying that my provisional naming is correct. This forms a valuable addition to the flora of District VIII.

Leucojum æstivum, L.—This plant was found growing in some abundance in a swamp by the river Slaney, near Macmine, in 1897, by Rev. E. S. Marshall, who stated (*Journ. Bot.*, 1898, p. 49) his conviction that the plant was native there. It was not admitted as such in *Cybele Hibernica*. Mr. Marshall repeated his opinion in *Journ. Bot.*, 1899, p. 272, and Messrs. Colgan and Scully reply on the general question in the same volume, pp. 315-7.

In May last Mr. Wm. F. Nicholson sent me specimens of this plant from near Waterford. In reply to inquiries Mr. Nicholson writes that the plant grows in Kilbarry Bog, on the outskirts of Waterford; that it has grown there for thirty or forty years; and that the place is not near any house or garden.

I have also received specimens from Mr. R. D. O'Brien, collected on the Clare side of the Shannon, two miles north of Limerick. The finder writes:—

"A creek enters the Shannon on the Clare side, about a quarter of a mile below the salmon weir, which is almost at the head of the tide-way, and the land intervening is the only bit of the Shannon marshes which has not been embanked. They are overflowed at spring-tides, and consist of marshy meadows and sallies.

"In June, 1897, I found *Leucojum* fruiting in the meadow, and have since observed it there every spring. This year I examined the place

carefully, and found it growing here and there in the meadows, and more abundantly in the sallies. I also traced it up the course of the creek as far as the tide flows. Following the water I dare say its habitat extends over something less than half a mile of ground. I also found two or three plants of *Narcissus biflorus* along the stream.

"There is a gentleman's place, 'Whitehall,' adjoining the creek, and it is possible that someone may have thrown a lot of the roots into the water, and that they were distributed by the tide; but I think this a very forced explanation of the occurrence of this deeply-rooting and not much cultivated bulb over so large an area, and in so scattered a way; besides it seems to be strictly confined to the land subject to tidal overflow. I searched all the places that I thought likely in the neighbourhood, but I could not get it elsewhere."

It will be seen that, although none of the stations mentioned are free from suspicion, the plant is at least well established in three localities in the southern half of Ireland, the habitat being in each case just the kind of ground that it effects in England (where Watson ranks it as a denizen, possibly native in the south-east) and on the Continent, where it has a wide range. Further investigation will probably show that it may be admitted as a permanent member of our flora, with the double dagger prefixed, which signifies "probably introduced."

Trichomanes radicans, Sw.—The investigations of Messrs. West and Tetley have added the Killarney Fern to the flora of Co. Fermanagh. They sent me a specimen last August, describing the exact locality—a deep crevice in limestone rocks; but I think it better not to publish the station, so terribly has this lovely plant suffered from the depredations of unscrupulous collectors.

National Library, Dublin.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include four Giant Tortoises from the Hon. Walter Rothschild, a pair of Wild Mallards from Mr. P. Donegan, a South African Penguin from Prof. D. J. Cunningham, and an Oyster catcher from Mr. E. Williams.

10,726 persons visited the Gardens during October.

DUBLIN MICROSCOPICAL CLUB.

MAY 3.—Mr. MOORE showed specimens of *Cribraria aurantiaca*, an interesting fungus of rare occurrence in Ireland. The specimens exhibited were found growing on the clay in the tubs in the large cool Fern-house at Glasnevin.

Mr. M'ARDLE exhibited leaves of the Yew-tree, closely covered with germinating pollen grains, which must have been blown a considerable distance by the wind.

Mr. W. N. ALLEN showed seeds of *Aristolochia serpentaria* taken from capsules found in a parcel of the dried rhizomes as an accidental admixture. The seeds are bluntly triangular, convex and warted on lower surface which is traversed by a thick fleshy white raphe.

MR. F. M. SELLENS exhibited two slides:—(1) a preparation of fossil Diatomaceæ from Monticelli, U.S., and (2) a preparation of Tripoli earth from Kritohelbergh, Bohemia.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOV. 6.—The President, Mr. J. BROWN opened the session with an inaugural address on "Some Matters Electric," with lantern and experimental illustrations.

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 6.—The winter session was opened with the usual *Conversazione* in the house of the Royal Irish Academy, 19, Dawson-street, under the presidency of Mr. GREENWOOD PIM, M.A. The attendance was large, notwithstanding the inclement weather. About 200 members and visitors were present, including many ladies. The function commenced, as on previous occasions, in the form of a social gathering, which was held from 7.30 till 8.45 p.m. At the latter hour the President took the chair, and made an opening address, welcoming all present to the inaugural meeting of the session. He then gave a succinct account of the work and progress of the Club. He was glad to see such a large attendance at the opening meeting, which compensated for the falling-off in the number of members attending this summer's excursions.

Next the Prize Awards were declared, the winners being as follows:—President's prize for a series of photo-micrographs of geological sections, Mr. H. J. Seymour; Flowering Plants, Miss E. M'Intosh, Mrs. R. D. Alcock; Crustacea, Mr. W. F. de V. Kane; Land and Fresh-water Mollusca, Miss Massy; Igneous rocks, Mr. Seymour. Reports from the various judges were read by the Hon. Sec., Dr. N. H. Alcock.

At nine o'clock Dr. C. J. PATTEN, Hon. Sec., commenced his lantern demonstrations on "Irish Birds." The speaker opened his address by urging on the members of the Club the necessity of bringing on communications at the winter ordinary meetings. To the junior members these remarks were particularly applicable. The Club required that more discussions should arise at the winter meetings. The membership was large, and, no doubt, if the members were encouraged, a more varied programme of scientific communications would be brought before the meetings. Following these remarks, Dr. Patten commenced to exhibit his lantern slides on "Irish Birds." Many of the scenes thrown on to the canvas were from photographs taken from nature, representing a variety of birds indigenous to Ireland, and some of the photographs were those of birds in captivity in the Dublin Zoological Gardens. A concise classification of Irish birds was gone into, and typical examples in each large order were exhibited on the screen to illustrate their habits.

As next speaker, Mr. R. M. BARRINGTON referred chiefly to the migration of birds as observed at Irish lighthouses and lightships. He dealt particularly with the migration of the common Song Thrush, a bird generally supposed to be resident and sedentary, but which comes to this country in great numbers between 20th October and middle of November. The course taken during the migratory flight was clearly indicated.

Mr. R. J. USSHER following, gave an interesting account of the habits and distribution of Irish birds in general. He urged that much more work could still be done on Irish ornithology, and he hoped to see workers in the field of ornithology persisting patiently in their arduous toil. The speaker referred to the increase and decrease of certain species, and he hoped that those birds approaching extinction would be vigorously protected.

Next Mr. SEYMOUR exhibited a series of lantern slides of rock sections. These were the prize micro-photographs, and were well executed.

Dr. ALCOCK showed some lantern slides of bats from nature, also of minute structures of nervous and vascular tissues. Many of these photographs were most difficult to prepare, and they showed much skill on the part of the exhibitor.

The President threw on the screen several capital photographs of birds and beasts in captivity in the Dublin Zoological Gardens, which afforded much interest to the audience.

During the evening a number of scientific exhibits were on view.

Mr. R. J. USSHER's collection of birds' eggs certainly require special mention. It was of very large extent, and occupied most of the centre table. It is admittedly the finest collection of its kind in Ireland, and a large series of the best clutches have now been acquired by the National Museum. Ornithological exhibits were strongly represented, including, in addition, some beautifully mounted specimens, of birds from Dublin Bay vicinity by Mr. Williams; rare specimens from the Science and Art Museum, shown by Dr. Scharff; together with Dr. Patten's exhibits illustrating the plumage, changes, and life-history of certain wading birds. Space will not permit of the description of all the exhibits, but among them may be mentioned the following:—Mr. Carpenter—Beech-wood bored by the Weevil, *Mesites Tardyi*; Professor Cole—Illustrations of gems and precious stones as they occur in nature; Dr. Foord—Irish Crinoids; Mr. J. N. Halbert—Collection of Water-beetles from the Museum series of Irish animals; Prof. Johnson—Fungus on Tobacco plant grown in Ireland; Mr. Patterson—Fungi from Dunran; Mr. Moore—Rare plants from Glasnevin; Mr. Seymour—Igneous rocks and photo-micrograph apparatus; Mr. Welch—Land and Fresh-water Shells.

Coffee was supplied shortly before 10 o'clock, at which hour a very successful and enjoyable meeting was brought to a close.

NOTES.

ZOOLOGY.

INSECTS.

Entomological Notes from Ulster.

Mr. W. H. Patterson, of Strandtown, Belfast, has continued his efforts to add to our knowledge of the coleopterous fauna of Ireland, and has sent me a number of beetles from various localities; the more interesting of his captures I now enumerate:—

At Ballycastle, mostly inland—*Philonthus laminatus*, Creutz., *Quedius mesomelinus*, Marsh., *Telephorus nigricans* v. *discoideus*, Steph., *Lema crichsoni*, Saffr., an interesting capture, extending the range of this insect from Cork to Antrim; *Crepidodera helixines*, L.

At Kilroot, near Carrickfergus—*Harpalus rufibarbis*, F., *Hydroporus vittula*, Er., *Homalium rufipes*, Fourc., *Corymbites quercus*, Gyll., *Brachypterus pubescens*, Er., *Cyphon nitidulus*, Thoms., *Anaspis ruficollis*, F., *Otiorrhynchus muscorum*, Bris., *Dorytomus tortrix*, L.

At Killough, Co. Down—*Pterostichus strenuus*, Panz., *Hydroporus lepidus*, Ol., *H. pubescens*, Gyll., *H. lituratus*, F., *Laccobius bipunctatus*, F., *Sphaeriatum marginatum*, F., *Liosoma ovatum*, Clairv.

At Strandtown, Co. Down—*Amara plebeia*, Gyll., *Noterus sparsus*, Marsh., *Phyllopertha horticola*, L., *Donacia vulgaris*, Zsch. (*typhae*, Ahr.), *Dorytomus tortrix*, L.

At Tollymore Park, Co. Down—*Cychramus fungicola*, Heer. Dr. Sharp, I believe, considers *C. fungicola*, Heer., and *C. luteus*, F., to be—the former the male and the latter the female of the same species; and in Fowler and Sharp's Catalogue *fungicola* is given as a synonym of *luteus*. *Epurea astiva*, L., *Adrastus limbatus*, F., *Athous niger*, L., *Corymbites quercus*, Gyll., *Helodes minuta*, L., *Grammoptera ruficornis*, F. Mr. Patterson also beat from trees a number of Hemipterous larvæ, which I referred to Mr. E. Saunders, who pronounces them to be the larval form of *Podisus* (*Asopus*) *luridus*, Fab.; they were present in numbers, but none of the perfect insect occurred.

At Newcastle, Co. Down, on sandhills—*Harpalus tardus*, Panz., *Dromius linearis*, Ol., *Byrrhus fasciatus*, F., *Lacon murinus*, L., *Strophosomus retusus*, Marsh.

At Stormount, Co. Down—*Byturus tomentosus* F., *Athous niger*, L., *Crepidodera ventralis*, Ill.

At Bundoran, on September 4, Mr. Patterson found swarms of *Coccinella* xi.-*punctata*, L., along with its larva on the Bent-grass and crawling on the sand; they must have been very numerous, for he remarks: "where they had congregated they were so numerous that a thousand might have been counted in a short time"; besides this Ladybird Mr. Patterson took *Brosicus cephalotes*, L., *Adimonia tanacetii*, L., *Otiorrhynchus atroapterus*, De G., a form with bright red femora, and *Barynotus Schonherri*, Zett.

At Groomsport, Co. Down—*Amara fulva*, Dej., *A. consularis*, Duft., *Cealambus impressopunctatus*, Sch. (*picipes*, F.)

Considering that Mr. Patterson makes no pretension to being an entomologist, I think he is much to be congratulated on the success that has attended his collecting; there are not many who would so unselfishly give their time and trouble to help others in a pursuit of which they themselves are practically ignorant. Mr. Patterson generously gives all his captures to me, and as he has not studied the Coleoptera he is deprived of that exquisite delight which attends the capture of a "good thing."

Mr. S. A. Stewart sent me a fine specimen of *Acanthocinus ædilis*, L., male, which was taken in the end of August by a workman on the Queen's Island, Belfast; the insect probably emerged from timber in the shipyard; whoever the captor was, he deserves commendation for capturing the beetle without injuring its immensely long antennæ.

My friend, W. A. Hamilton, Esq., of Coxtown, Co. Donegal, sent me, on August 10, a fine specimen of *Carabus glabratus*, Payk., which he had captured on a mountain about three miles from Coxtown. In a letter dated September 12 the same gentleman writes that he has during the season seen six *Vanessa io*, L.—five at Coxtown and one at Coolmore—so that the butterfly is evidently pretty well established in that locality. He also sent me a specimen of the pretty Hymenopteron, *Chrysis ignita*, and from a description given, *Sirex gigas* has turned up at Coxtown, causing an alarm of "hornets" to be raised.

From another part of Donegal, viz., Narin, by the kindness of Colonel W. J. Alexander, of Acton House, Poyntzpass, I received specimens of *Thecla rubi*, L., *Zygæna loniceræ*, Esp., *Euthemonia russula*, L., *Cerura vinula*, L., and *Anarta myrtilli*, L.

Of captures made here I have but few to record:—a few days ago I took *Bembidium bruxellense*, Wesm., in my potato field crawling about among the lumps of earth; in July I took *Herminia grisealis*, Hb., *Plusia pulchrina*, Haw., *Gonoptera libatrix*, L., *Cidaria pyraleata*, L., which is much more like forms from York than those from Donegal, and *Eurrhypara urticata*, L. On August 10th, *Heliophobus popularis*, Fab., flew into my dining-room and was captured. On September 5 I made a capture which much pleased me. I was returning from paying a visit in Co. Down, and was walking along a by-road in the townland of Loughadian not very far from Poyntzpass, when a Painted Lady (*Vanessa cardui*, L.) settled on the road just in front of me. I had no net, so made at the butterfly with my hat; my first attempt was a failure, but the butterfly settled again on the road, and using greater caution I got my hat over it, and as I had a box in my pocket soon had it safe. It was a perfectly fresh specimen, the result no doubt of eggs laid in the early summer by some immigrant. *Vanessa atalanta*, L., was remarkably plentiful this autumn, and I found one to-day (October 15) on my avenue where it had evidently dropped and been trodden on. I was in Armagh on October 11, and was informed by a man that a shopkeeper in the town had captured a wonderful "bat." I knew from experience that this meant a large moth.

On visiting the shopkeeper in question, Mr. Alexander Wallace, grocer, Scotch-street, I found that the "bat" was a fine Death's-head moth. It had flown into his kitchen, whither I think it was probably attracted by a bunch of bananas that were hanging there. In my last note (*ante*, p. 184), I mentioned the appearance of numbers of the Hemipteron, *Piezodorus lituratus*, Fab., in May, and remarked that the time of appearance was different from that given by Mr. Saunders. I wrote to Mr. Saunders on the subject, and he replied that in indicating autumn he merely meant that the insect was most usually met with at that time. I have this day (October 18th) found the autumn brood in abundance on gorse, evidently just out.

W. F. JOHNSON.

Poyntzpass.

Vanessa io in Co. Down.

Perhaps the following may be of use to you:—A friend of mine, when at Newcastle, Co. Down, about the third week in October, saw several of the Peacock Butterfly, *Vanessa io*, and captured one. Mr. W. Gray saw one in his garden 'at Belfast. One was brought to me got here, but this may have been an escape, as I had a quantity of larvæ feeding, which I got sent from Donegal. I see by the guide book there is only one specimen recorded.

J. HAMILTON.

Holywood, Co. Down.

Gnophria quadra in Co. Wexford and the Isle of Man.

The rare moth, *Gnophria quadra*, occurred in some numbers about Ballyhyland this year. I came across two females and (I think) four males between July 28th and August 10th. These were all picked up after heavy rains, the males mostly in a very bedraggled state, and both the females dead, and I made no attempt to preserve them. I have since seen, with regret, that there is no specimen of this moth in the Irish collection in the Museum. It has previously been recorded for Co. Wexford.

Since writing the above note I have had a letter from my friend, Mr. H. Shortridge Clarke, F.E.S., of Sulby, Isle of Man, who has a splendid collection of Manx lepidoptera, the result of many years' work, and he informs me that the same species turned up this year for the first time in the Isle of Man, where three specimens were taken. I think this is a very interesting coincidence, when we consider how closely the fauna of the Isle of Man resembles that of Ireland.

C. B. MOFFAT.

Ballyhyland.

FISHES.

Porbeagle Shark and Tope in Killala Bay.

About the middle of October, when walking along the sands of Ennis-crone, looking out for any storm-worn birds that might have been driven ashore by the N.W. gale of the previous days, I came across a specimen

of the Porbeagle Shark, *Lamna cornubica* (Yarrell); it was about four feet in length. It appears to be very rare on this coast, being the only specimen I have ever met.

On the same day I found a specimen of the Tope Dogfish, *Galeus vulgaris* (Yarrell), about a hundred yards from where the Porbeagle was lying, and in appearance the contrast between the two fishes was very remarkable, the rounded pig-like form of the Porbeagle with its large round eyes, looking so utterly different, from the long, slender body of the Tope, with its flattened, depressed head and small oval-shaped eyes.

ROBERT WARREN.

Moyview, Ballina.

BIRDS.

Crossbills nesting in South Cork.

Mr. Moffat's remark (see p. 254 above), that the Crossbill is increasing as a breeding species in Ireland reminds me that among our bird visitors during the severe weather of February last we had a pair of Crossbills which nested with us, and I have seen no record of their yet nesting in Cork, though they nested in Tipperary in 1839.

I first noticed them on the morning of February 20th, before the snow which fell on the 10th had all melted, and though I did not actually see their nest till a fortnight later, I am sure that it was then finished. So that the brave little birds had commenced building while long icicles were still hanging in places from the pine branches, and perhaps while many other birds were dying of cold. Starlings especially suffered. On the morning of the 14th fifteen of them died in our stable about thirty yards from the site of the Crossbills' nest, and from the 10th to the 14th very many Starlings, Redwings, Song Thrushes, Fieldfares, and Blackbirds, besides some smaller birds, died, though haws and ivy berries were plentiful then and long after. I, however, saw no dead Mistle Thrushes.

Well, as I have already said, the Crossbills had their nest quite finished before the 20th; they very obligingly nested right in front of the house, where from either my bedroom or breakfast-room windows I could easily watch them coming and going until I left at 10 o'clock, though the nest was hidden by a branch. And in the evenings after school my little son kept sharper eyes than mine on their movements during preparation time, and reported anything unusual. They were very tame, the cock often allowed us to come quite close while he rested on a bare ash branch or hacked at a fir cone. We never saw either of them on the ground save once when the cock rose from some Raspberry canes, but occasionally he alighted on the eave-shoots perhaps for water. The nest was hard to see from the ground, and I was afraid of frightening them by climbing the tree on which for a long time before we saw it we knew it was. Hatching commenced on February 23rd; before then the pair were always together, but afterwards the cock was usually alone. I did not go to see the nest till March 9th. Nothing disturbed them. Our cat had disappeared for ever since last year. I saw him from the window

standing in a Mistle Thrush's nest. Robins' and Wrens' nests had been previously destroyed, but not since; and for some time I have discouraged the visits of Grey Crows, Magpies, and Sparrow Hawks with a gun.

On April 1st the young birds took their first fly, and until the 12th we saw two or three or four almost every day. We have seen none since, but hope, though we hardly expect, they will, favour us again next February. Anyway we made their stay with us as pleasant for them as we knew how.

Bramblings were rather plentiful while the snow lasted, as usual during our rare heavy snowfalls, though we never see one at other times. Eight or ten came every morning to feast on some seeds provided, they, like their cousins the Chaffinches, seemed little the worse for the cold. I also saw Bramblings in two other places at some distance then. They were equally plentiful in January, 1894, but for six years we had not seen any.

Perhaps in these rambling notes I may mention that the Swallows have not all left us yet. At least three were here on November 8th. The latest date I have ever seen them was November 19th, but even here their appearance any time in November is unusual.

Skibbereen.

JOHN J. WOLFE.

The Ruff in Ireland.

I have read with very much interest Dr. C. J. Patten's article in the August number on the Natural History of the Ruff in Ireland, and though at present away from Ireland, cannot refrain from sending a very brief note on a specimen shot in August, 1895 or 1896, at Calary Bog, Co. Wicklow. This specimen, a female adult, was stuffed for me by Mr. Williams, of Dame-street, who will be able to furnish Dr. Patten full particulars should he desire them. I shot it in the identical spot where I shot two Wood Sandpipers a year or two afterwards, this fully bearing out Dr. Patten's accurate remarks about the inland migratory habits of the Ruff, and its partiality for heathery and peaty districts. As my address shows, I am away far from my ornithological note-books, which are locked up at my home.

ERNEST BLAKE KNOX.

Lydenberg, Transvaal.

MAMMALS.

The Vision of Cetaceans.

In the summer of 1887 I stayed some time at the head of Loch Alsh, in Ross-shire. There was at the time of our coming there a Porpoise with two young calves. The two calves were usually to be seen basking on the water, with their heads and backs well above the surface. I never saw them go under. There they used to lie quietly enough; but whenever we tried to approach them they would at once begin to move away, always keeping about the same distance from our boat. There did not appear to be any reason for doubting that they were watching our movements.

Howth.

W. E. HART.

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